**Hallucinating Facts: Psychedelic Science and the Epistemic Power of Data**
**Emma Stamm**

**Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State University**
**in partial fulfillment of the requirements for the degree of**

**Doctor of Philosophy**
**In**
**Social, Political, Ethical, and Cultural Thought**

**François Debrix, Chair**
**Rebecca Hester**
**Timothy W. Luke**
**Ashley Heflin**

**February 24, 2020**
**Blacksburg, VA**

Keywords: Data, Big Data, Technology, Digitality, Political Economy, Epistemology, Psychedelics, Hallucinogens, Deleuze, Foucault, Critical Data Studies, Critical Information Studies, Critical Theory, Continental Philosophy, Philosophy of Technology, Philosophy of Science, Media Studies, Critical Media Studies, Social Theory, Cultural Theory, History of Science, Digital Methods, Artificial Intelligence, Machine Learning

Hallucinating Facts: Psychedelic Science and the Epistemic Power of Data

Emma Stamm

Academic Abstract

This dissertation is a theoretical study of the relationship between digitality, knowledge, and power in the age of Big Data. My argument is that human medical research on psychedelic substances supports a critique of what I call "the data episteme." I use "episteme" in the sense developed by philosopher Michel Foucault, where the term describes an apparatus for determining the properties associated with the epistemic condition of scientificity. I write that the data episteme suppresses bodies of knowledge which do not bear the epistemic virtues associated with digital data. These include but are not limited to the capacities for positivistic representation and translation into discrete digital media. Drawing from scientific reports, I demonstrate that certain forms of knowledge regarding the therapeutic mechanisms of psychedelics cannot withstand positivistic representation and digitization. Henceforth, psychedelic research demands frameworks for epistemic legitimation which differ from those predicated on the criteria associated with the data episteme. I additionally claim that psychedelic inebriation promotes a form of thinking which has been called, by various theorists, "negative," "abstract," or "idiosyncratic" thought. Whereas the data episteme denies the existence of negative thought, psychedelic research suggests that this mental function is essential to the successful deposition of psychedelic substances as adjuncts to psychotherapy. For the reasons listed above, psychedelic science provides a uniquely salient lens on the normative operations of the data episteme.

As it suppresses non-digitizable knowledge, the data episteme also implements what Foucault conceptualizes as "knowledge-power," a term which affirms the fact that there is no meaningful difference between knowledge and power. Here, "power" may be defined as the power to promote but also to retract conditions on which phenomena may exist across all sites of social, intellectual, and political construction. I write that the data episteme seeks to both nullify the preconditions for negative thought and to naturalize the possibility of an infinite expansion of human mental activity, which in turn figures mentality as an inexhaustible resource for the commodity of digital data. The data episteme therefore reifies the logic of ceaseless economic proliferation, and as such, abets technologized capitalism. In the event that the data episteme fulfills its teleological goal to become total, virtually all that is thinkable would yield to economic subordination. I present psychedelic science as a site where knowledge which challenges the data episteme is empirically necessary, and which, by extension, attests to the existence of that which cannot be economically subsumed.

Hallucinating Facts: Psychedelic Science and the Epistemic Power of Data

Emma Stamm

General Audience Abstract

In the age of Big Data, scientists draw upon the ever-expanding quantities of information which are produced, circulated, and analyzed by digital devices every day. As data grow in number, these tools gain in their ability to yield precise and faithful information about the objects they represent. It appears that all forms of knowledge may one day be perfectly replicated in the form of digital data. This dissertation claims that certain forms of knowledge cannot be digitized, and that the existence of non-digitizable knowledge has important implications for both science and politics. I begin by considering the fact that digital tools can only produce knowledge about phenomena which permit digitization. I claim that this limitation necessarily restricts the sorts of information which digital devices may generate. I also observe that the digital turn has inaugurated a novel mode of capitalist economic production based on the commodity of digital information. The increasing dependence of scientific authority on digital methods is therefore also a concern for political economy. I argue that the reliance of scientific authority on digital data restricts the scope of scientific inquiry and makes ceaseless economic expansion appear both necessary and inevitable. It is thus critical to indicate sites of research and practice where non-digitizable knowledge plays an essential role in informing scientific processes. Such an indication is not only pertinent to scientific research, but also points up the ways in which data facilitate unregulated economic growth.

Psychedelic drug research serves as my lens on digitality and political economy. Specifically, I explore the ways in which quantitative and computational methodologies have been used and critiqued by scientists who study the psychiatric benefit of psychedelics on human consciousness. Taking a historical approach, I demonstrate that psychedelic scientists have always faced the paradoxical task of translating the unusual and ineffable effects of psychedelics into discrete, measurable variables. This quandary has become more pronounced in the age of digital tool use, as such tools rest on the logic of metrical and discrete analysis. I suggest that the therapeutic mechanisms of psychedelics can only be fully revealed by methodological techniques which explicitly address the epistemic limitations of digital data. Noting that the ascendance of Big Data is contemporaneous with a rise of interest in psychedelics as adjuncts to psychotherapy, I assert that psychedelic science provides abundant materials for a critique of the ostensive epistemic authority of digital data, which operates as an alibi for technologized capitalism.

*For Eric*

*Acknowledgements*

First, I would like to thank my indefatigable advisor, François Debrix. My dissertation owes much to his perceptive reading and editing of my work, and to his commitment to my success. Thank you also to each member of my committee: Rebecca Hester, Timothy Luke, and Ashley Shew. My project benefited significantly from their contributions, and from the confidence that they instilled in me from the earliest days of the writing process.

Deep gratitude to my parents, Barbara and David Stamm, for their love and lifelong support of my academic pursuits. Thank you also to my twin brother, Eric; my sister, Arielle; and my nephew, Benjamin.

My partner, Mario Khreiche, is in a category all his own. His love, intelligence, wisdom and humor have been crucial to my well-being throughout the entirety of the project. I look forward to our life together.

I am enormously grateful for my friends, colleagues and mentors at Virginia Tech and in the Blacksburg community. In no particular order: Tamara Sutphin, Mauro Caraccioli, Brett Shadle, Tom Ewing, Emily Bianchi, Faith Skiles, Sascha Engel, Damien Williams, Maddie Tepper, Anthony Szczurek, Jack Leff, Kirsten Brown, Kristen Koopman, Alex Stubberfield, Trevor Jamerson, Komal Dillon-Jamerson, Joshua Earle, Matthew Brisendine, Janet Convery, Patrick Salmons, Judson Abraham, Ryan Artrip, Jordan Laney, Molly Todd, Leigh McKagen, Mary Ryan, Nada Berrada, Robert Flahive, Shaun Respess, Sarah Plummer, Samantha Fried, Jennifer Lawrence, Sengul Yildiz Alanbay, Claire Constantikes, Caleb Flood, and Tim Filbert.

Thank you also to family and friends further afield, including Rollie Stamm, Ronna Stamm, Paul Lehman, Angus McPhee, Elizabeth McPhee, Nikki McPhee, Neil McPhee, Claire McPhee, Ingrid Khreiche, Patricia Khreiche, Matthias Winter, Andre Khreiche, Abdallah Khreiche, Gabi Kuhlgert, Rosa Khreiche, Nassif Khreiche, Philip Mazzullo, Nina Bar-Giora, Nicholas Rake, Yonatan Miller, Brad Gorfein, Richard Schwab, Henry Kramer, Heather Ording, Joseph Contento, Heather Duke, Marc Greene, Jonathan Frost, Tove Innis, Randy Walker, and Melissa Patel.

Special thanks to my online community of interlocutors, and to my students at Virginia Tech. The work is just beginning.

**Table of Contents**

*The Great Khan's atlas contains also the maps of the promised lands visited in thought but not yet discovered or founded: New Atlantis, Utopia, the City of the Sun, Oceana, Tamoé, New Harmony, New Lanark, Icaria.*

*Kublai asked Marco: "You, who go about exploring and who see signs, can tell me toward which of these futures the favoring winds are driving us."*

*"For these ports I could not draw a route on the map or set a date for the landing. At times all I need is a brief glimpse, an opening in the midst of an incongruous landscape, a glint of light in the fog, the dialogue of two passersby meeting in the crowd, and I think that, setting out from there, I will put together, piece by piece, the perfect city, made of fragments mixed with the rest, of instants separated by intervals, of signals one sends out, not knowing who receives them. If I tell you that the city toward which my journey tends is discontinuous in space and time, now scattered, now more condensed, you must not believe the search for it can stop. Perhaps while we speak, it is rising, scattered, within the confines of your empire; you can hunt for it, but only in the way I have said."*

*Already the Great Khan was leafing through his atlas, over the maps of the cities that menace in nightmares and maledictions: Enoch, Babylon, Yahooland, Butua, Brave New World.*

*He said: "It is all useless, if the last landing place can only be the infernal city, and it is there that, in ever-narrowing circles, the current is drawing us."*

*And Polo said: "The inferno of the living is not something that will be; if there is one, it is what is already here, the inferno where we live every day, that we form by being together. There are two ways to escape suffering it. The first is easy for many: accept the inferno and become such a part of it that you can no longer see it. The second is risky and demands constant vigilance and apprehension: seek and learn to recognize who and what, in the midst of the inferno, are not inferno, then make them endure, give them space."*[1]

[1]Italo Calvino, *Invisible Cities*, trans. William Weaver. (Orlando, FL: Harcourt, 2006), 165.

## Chapter 1: Introduction: Data, Knowledge, and Power

*The archive cannot in principle contain the world in small; its very finitude means that most slices of reality are not represented. The question for theory is what the forms of exclusion are and how we can generalize about them.*

Geoffrey Bowker, "The Data/Theory Thing"[2]

### The Data Episteme

Digital data are ubiquitous, and their number is growing. At the end of the year 2010, roughly 1.3 trillion gigabytes of data existed globally.[3] In 2020, this quantity is expected to rise to forty trillion.[4] As data accumulate, they impact all arenas of individual and social life.[5] The advent of digital data has been recognized in particular for its effect on the global economy. In 2017, *The Economist* published an article provocatively titled "The World's Most Valuable Resource Is No Longer Oil, It Is Data."[6] The editorial prompted several rebuttals. In February 2019, *Wired Magazine* published a response from technology entrepreneur Antonío Garcia Martínez, who decried the titular premise. "Data isn't the new oil, in almost any metaphorical sense," Martínez declares, and adds that "it's supremely unhelpful to perpetuate the analogy."[7] By his testimony,

---

[2] Geoffrey Bowker, "The Data/Theory Thing: Commentary," *International Journal of Communication* 8 (2014), 1795–1799.

[3] Josh Halliday "Infographic: Just How Much Data Exists in the Digital Universe?" The Guardian, Guardian News and Media. Last updated August 2, 2010. www.theguardian.com/media/pda/2010/aug/02/infographic-data-cloud.

[4] Petrov, Christo Petrov, "16 Big Data Statistics – The Information We Generate [2020]." Tech Jury. February 18, 2020. https://techjury.net/stats-about/big-data-statistics/#gref.

[5] Throughout my project, I take the word "data" to mean units of digital computation. Thus the word "data" may be understood to refer to "digital data." I discuss the relationship between data and digitality in greater detail further in this chapter.

[6] "The World's Most Valuable Resource Is No Longer Oil, but Data." The Economist, The Economist Newspaper. Accessed March 3, 2020. https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data.

[7] Antonio García Martínez. "No, Data Is Not the New Oil." Wired. Conde Nast, February 25, 2019. https://www.wired.com/story/no-data-is-not-the-new-oil/.

there is a critical flaw in the comparison between oil and data. As he explains, oil-producing firms profit from the sale of oil to other companies. By contrast, the business model of the most prominent data technology firms demands that they keep their most valuable asset, which is knowledge, to themselves.[8]

To exemplify this point, Martínez asks the reader what they would do if they happened to come into private possession of all of the data representing the past year's user browsing activities and sales from Amazon.com, one of the most world's most profitable technology corporations. In the following passage, he contends that this data represents much greater financial value to Amazon than it does to those unaffiliated with the company:

> Sure, you could maybe sell some of that data—there are companies that would love to know Amazon's sales data or Google's search queries or Uber's routing and pricing history. But here's the key thing: Those interested outside parties are competitors, and the owners of the data *would never in a million years sell it.* Uber isn't selling data to Lyft, Amazon isn't selling data to Walmart, and Airbnb sure isn't selling user lists to Hotels.com.[9]

Here, Martínez observes that the economic value of data resides in their capacity to be instrumentalized as information, and that this information equips all who wield it with power. Although the aforementioned companies all provide numerous goods and services, Martínez makes clear that they are ultimately in the business of producing and enriching themselves with knowledge.

[8] Martínez, "No, Data Is Not the New Oil."
[9] Martínez, "No, Data Is Not the New Oil."

As data continue to proliferate, they are increasingly invoked to generate and authorize information of every conceivable type. Data are primarily valuable in an epistemic capacity, and the economic success of data is predicated on the commodification of knowledge. The interfusion of data, knowledge, and economic power has made digital technology into a world-shaping force.

Because the value of data resides in their ability to yield knowledge, the advent of data also has crucial implications for epistemology, or the arena of philosophical thought which inquires into the definition, application, and implications of knowledge in its manifold forms. My dissertation identifies the theoretical predicates by which bodies of knowledge are considered to be legitimate in the age of "Big Data," a phrase used to frame the acceleration of digital data in social terms.[10] I assert that data promote specific criteria by which knowledge may be considered scientifically authoritative. In other words, data constitute a particular *episteme*, or a discursive mechanism which determines the properties associated with "scientificity," or the epistemic condition of "being scientific." I call this mechanism "the data episteme." The data episteme authorizes and naturalizes the notions that scientific knowledge demands corroboration by digital methods. Furthermore, it abets the expansion of the digital data economy by making digitality a prerequisite for intellectual legitimacy.

The concept of the episteme was developed by philosopher Michel Foucault, who throughout his career investigated the relationship between knowledge, power, and human life. My usage of the term "episteme" follows the definition provided by Foucault in the following passage. As he writes,

[10] Bernard Marr, "What Is Big Data?," Accessed January 24, 2020. https://www.bernardmarr.com/default.asp?contentID=766.

> I would define the episteme… as the strategic apparatus which permits of separating out from among all the statements which are possible those that will be acceptable within, I won't say a scientific theory, but a field of scientificity, and, which it is possible to say are true or false. The *episteme* is the "apparatus" which makes possible the separation, not of the true from the false, but of what may from what may not be characterised as scientific.[11]

By the terms of the data episteme, the capacity to be represented as digital data is a precondition for scientificity. The argument of my dissertation is that psychiatric research on and practice with psychedelic substances implies a theoretical critique of the data episteme. Stated differently, psychedelic science indicates limits to the ability of digital data to validate scientific knowledge. My dissertation aims to demonstrate that psychedelic research is a particularly suitable challenge to the data episteme.

The category "psychedelic" encompasses a wide variety of mind-altering substances. The bulk of psychiatric research on psychedelics has been conducted on what are known as the "classic" psychedelics. This category includes lysergic acid diethylamide (LSD), psilocybin (the active compound in "magic mushrooms"), and mescaline, which is found in the peyote cactus plant. There have also been notable studies on dimethyltryptamine (DMT), which is a major component of the hallucinogenic brew Ayahuasca, along with ibogaine, which has a long history

[11] Michel Foucault, *Power/Knowledge: Selected Interviews and Other Writings, 1972-1977*, ed. Colin Gordon, trans. Colin Gordon et al. (New York, NY: Pantheon Books, 1980), 197.

of medicinal use in West Africa.[12, 13] These substances are linked through the character of their effects: psychedelics typically catalyze hallucinations and significant alterations in cognition and mood, and often impart a distinct impression of unreality along with a sense of divine or mystical import.[14]

Contemporary research on psychedelic substances follows a decades-long fallow period. LSD and psilocybin were first synthesized in laboratory environments in 1938 and 1958, and numerous studies conducted between the 1940s and 1960s indicated their efficacy in the treatment of addiction, depression, anxiety, and related maladies. The year 1970, however, saw the effective suspension of almost all psychedelic studies across the globe. 2014 marked the publication of the first peer-reviewed research on LSD in over forty years.[15] Although the reasons behind the hiatus are multifaceted, it is largely attributed to legal and scientific complexities which emerged toward the end of the 1960s. These issues are explored in detail in chapters four and five

Throughout his career, Foucault articulated a mutual dependency between knowledge and the capacity for domination. In his book *Discipline and Punish: The Birth of the Prison*, he writes that "power and knowledge directly imply one another… there is no power relation

[12] Some scholars include the drugs MDMA and ketamine under the label "psychedelic," although this categorization is questionable, as they do not typically produce hallucinatory effects. MDMA and ketamine are often categorized under the different, but related, label of "dissociative." The matter of whether MDMA or ketamine are truly "psychedelic" is beyond the scope of my project, although it may bear mentioning that I do not cite MDMA and ketamine research. See https://www.drugabuse.gov/publications/research-reports/hallucinogens-dissociative-drugs/what-are-dissociative-drugs.

[13] National Institute on Drug Abuse. "Common Hallucinogens and Dissociative Drugs." NIDA. Accessed January 29, 2020. https://www.drugabuse.gov/publications/research-reports/hallucinogens-dissociative-drugs/what-are-dissociative-drugs.

[14] Due to their tendency to provoke hallucinations, psychedelics are often called "hallucinogens." I use the term "psychedelic" because it is more common in the scientific literature. The word "hallucinogen" should be taken to refer to psychedelics,

[15] "MAPS Press Release: LSD Study Breaks 40 Years of Research Taboo." MAPS. Accessed January 24, 2020. https://maps.org/research/psilo-lsd/lsd-news-timeline/5205-maps-press-release-lsd-study-breaks-40-years-of-research-taboo.

without the correlative constitution of a field of knowledge, nor any knowledge that does not presuppose and constitute at the same time power relations."[16] To conceptualize psychedelic science as a confound to the data episteme therefore disaffirms the power relations presupposed and reinforced by data assemblages.

Foucault emphasizes that epistemes are contextually determined. In other words, the nature of scientificity, as determined by epistemes, is not consistent across time and space. Given their inclination to change, it is not easy to identify and characterize the principles associated with epistemes. Yet Foucault tells us that this task is politically necessary. As he writes, scientific knowledge always serves the purpose of regulating, controlling, subduing, and dominating human life.[17] In *Discipline and Punish*, he describes the ways in which political interests utilize knowledge as a means towards subjugation. He asks readers to imagine a political "anatomy," which would entail neither "the study of a state in terms of a 'body' (with its elements, its resources and its forces)" nor "the study of the body and its surroundings in terms of a small state."[18] Foucault instead translates the term "political anatomy" as "the 'body politic,'" which is, he writes, "a set of material elements and techniques that serve as weapons, relays, communication routes and supports for the power and knowledge relations that invest human bodies and subjugate them by turning them into objects of knowledge."[19]

Here, Foucault indicates that the dyadic knowledge-power conceives of human bodies as objects wholly available to knowledge-making procedures. In this view, "the human" exists as a consolidation of knowledge-power, and constitutive domains of human life emerge only after their epistemic interpellation. In his books *Madness and Civilization: A History of Insanity in the*

[16] Foucault, *Discipline and Punish*, 27.
[17] Foucault, *Discipline and Punish*, 27.
[18] Foucault, *Discipline and Punish*, 27.
[19] Foucault, *Discipline and Punis*h, 28.

*Age of Reason* (1961), *Discipline and Punish: The Birth of The Prison* (1975), and *The History of Sexuality* (1976), Foucault explores knowledge-power as it produces the notions of mental salubrity, political subjectivity, and sexuality respectively. The verifiable existence of these phenomena, he claims, is predicated on their complicity with the criteria of a dominant episteme.

Following Foucault, I do not assume as given any ontic or epistemic preconditions for the phenomena of human life or the body politic. I instead utilize psychedelic science as a lens through which to critically engage the epistemic principles which construct both human life and the body politic after the digital turn. As Foucault demonstrates, such principles facilitate political subordination by representing human existence not as a product of the operations of an episteme, but as existing prior to discursive construction and political instrumentalization. When criteria for epistemic legitimation are not understood as political instruments, they cannot be assessed for their political implications. Thus the commonplace which holds that scientific knowledge lies beyond the reach of political construction serves to insidiously reinforce political hegemony.

The data episteme promotes forms of knowledge which accommodate digitization and suppresses those which do not.[20] In so doing, it contributes to the digital data economy, as it effectively redefines knowledge as the exclusive product of digital applications. This process of exclusion may also be considered as an implementation of knowledge-power or as a promotion of a normative and scientific worldview. In their article "Critiquing Big Data: Politics, Ethics, Epistemology," technology researchers Kate Crawford, Kate Miltner and Mary L. Gray argue

[20] Throughout my project, I use the terms "digitize" and "datafy" interchangeably. There is little scholarly consensus on how these terms relate to and differ from one another. My usage of "digitization" and "datification" denotes the process of "discretization," which I investigate in this chapter. To summarize here, I define "digital data" as "discrete computable variables." Thus the process of rendering phenomena as digital data entails translation into discrete formats. I use the terms "digitize" or "datafy" to emphasize, stylistically, that I explore discrete data variables as they are used by digital computers.

that data constitute "an emerging *Weltanschauung,"* or theoretical worldview.[21] The data *Weltanschauung,* they claim, is "grounded across multiple domains in the public and private sectors," and is in "need of deeper critical engagement."[22] Moreover, insofar as date mediate and represent human life, they "present blind spots and problems of representativeness, precisely because it cannot account for those who participate in the social world in ways that do not register as digital signals."[23] I would add that the data episteme does not recognize any phenomenon which "does not register as digital signals." Hence the following problematic: what does not register as digital signals? My dissertation claims that the therapeutic mechanisms of psychedelic substances cannot be expressed as digital data because these mechanisms resist expression as positivistic signs. As I demonstrate in chapters three and five, psychedelics effect a distinctly non-positivist form of cognition, and their therapeutic potential depends on this mental phenomenon. For this reason, I construe psychedelic science as a refutation of positivism.

**Positivism and Digital Knowledge Problems**

I use "positivism" in the sense meant by philosopher Auguste Comte. In his book *A General View of Positivism,* Comte proposes positivism as an epistemological framework designed to rectify what he perceived to be a mistake in religious knowledge systems, which is that they do not necessitate external proof for validation.[24] Comte claimed that the acceptance of faith, introspection, or alleged divine intervention as provenants of knowledge discounts the epistemic authority of the external world, or phenomena whose existence is alleged to be independent of

[21] Kate Crawford et al., "Critiquing Big Data: Politics, Ethics, Epistemology. Special Section Introduction." *International Journal of Communication* 8 (2014): 1664.
[22] Crawford et al., "Critiquing Big Data," 1664.
[23] Crawford et al., "Critiquing Big Data," 1667.
[24] Auguste Comte, *A General View of Positivism*, 26.

human observation. Comte thus defined the capacity for validation by shared consensus as a prerequisite of knowledge. He explains "positivism" as follows:

> The subjective principle of Positivism, that is, the subordination of the intellect to the heart is thus fortified by an objective basis, the immutable Necessity of the external world; and by this means it becomes possible to bring human life within the influence of social sympathy… In theological systems the objective basis was supplied by spontaneous belief in a supernatural Will. Now, whatever the degree of reality attributed to these fictions, they all proceeded from a subjective source; and therefore their influence in most cases must have been very confused and fluctuating. In respect of moral discipline they cannot be compared either for precision, for force, or for stability, to the conception of an invariable Order, actually existing without us, and attested, whether we will or no, by every act of our existence.[25]

Positivism advances forms of knowledge which comply with standards determined by multiple people and which remain consistent across multiple contexts. Because I construe psychedelic science as a refutation of positivism, I do not identify standards of practices or general features of psychedelic science which might be said to oppose the signature functions and properties of data episteme. Because the data episteme crystallizes and compounds positivistic virtues, no systematization of positivistic qualities could serve as its theoretical opposite. I instead articulate the ways in which psychedelic science defies positivism as it is axiomatized by the digital production of knowledge.

[25] Comte, *A General View of Positivism*, 26.

In “Theses on the Epistemology of the Digital: Advice for the Centre for Digital Studies,” English Literature scholar Alan Liu argues that the spread of data undermines all established criteria for epistemic authorization.[26] As he writes, bodies of knowledge are normally evaluated by hierarchical schematics which determine their legitimacy as respectively “more” or “less.” By these frameworks, intellectual authority is premised on a capacity for relativistic comparison against other bodies of knowledge. Liu claims that the contemporary digital epistemic inundation calls the usefulness of these comparative measures into question. As he puts it,

> It is unclear that the epistemology of the digital respects, or should respect, a vertical axiology of truth. Some of the most important dimensions of the digital extend laterally in networked, distributed, and other “inch-deep but mile-wide” formations. Big data or crowd data is bottom-up data, not high data (in the sense of “high church” or “high Latin”) . . . In the digital age, in other words, the “wisdom of the crowd” challenges the very notion of an epistemology, or philosophy, of knowledge.[27]

In “Theses on the Epistemology of the Digital,” Liu argues that all scholars interested in digitality should contribute to the construction of theoretical frameworks designed to address the epistemological complexities of data.[28] These schemata would not only account for the problem described above, but for all digital epistemic paradoxes. This essay does not identify possible theoretical precepts for a new epistemology of the digital. Rather, Liu proceeds by describing the

[26] Alan Liu, “Theses on the Epistemology of the Digital: Advice for the Centre for Digital Studies,” 2014
[27] Liu, “Theses on the Epistemology of the Digital”
[28] “Theses on the Epistemology of the Digital” was solicited as a response to Liu’s work in planning the Centre for Digital Knowledge at Cambridge University

particularities of specific epistemic paradoxes, as in the passage excerpted above. Here, he continues his investigation of the dissolution of truth-making hierarchies:

> If we were to juxtapose the Enlightenment with the digital age, we might say that (a) the French Revolution paid quit to philosophy (and *philosophes*) by advancing a mob mentality that later nineteenth-century "historicists" (and twentieth-century revisionary historians of the Revolution such as François Furet) could only "know" by displacing the Revolutionary "idea" into notions of "spirit [*Geist*]," "rumor," "representation," etc.; and (b) the "digital commons" and "open" movement now represents the resurgence of a similar crowd knowledge challenging scholars. Then and now, the difficulty is that the object of inquiry puts in question the knowledge-standards of scholarly inquiry itself. [29]

In this passage, Liu implies that his elusive object of inquiry — an epistemology for the Big Data age — exists as a manifest potentiality awaiting discovery and theorization. Liu does not recognize that the condition of existing as independent of a single human mind — in other words, the condition of positivistic existence — is the foundational predicate of digital knowledge production. Thus his inquiry into epistemology anew, as explained above, is ill-conceived. This is because it does not permit the reflexive acknowledgment of Comtean positivism as the theoretical ground of the data episteme.

Liu claims that digital epistemology must be investigated and described as such in the interest of attracting scholarly attention. Regarding the abundance of research on digitality across multiple disciplinary frameworks, or what he calls "gestalts," he writes that epistemology "must be robust enough to compete with such more common gestalts as 'society,' 'politics,' 'culture,'

[29] Liu, "Theses on the Epistemology of the Digital"

and ‘economy’ (represented in such phrases as ‘information society,’ ‘surveillance society,’ ‘social media,’ ‘online culture,’ ‘information economy,’ etc).” [30]At this moment in his essay, Liu addresses the founding members of the Cambridge Centre for Digital Knowledge, who had sought his counsel as they planned the Centre’s research curriculum. He advises that the Centre develop its curriculum as a sort of search for a digital epistemology. Towards this end, he suggests that affiliates of the Centre should “design a sequence of events, activities, and outputs that foreground the specific force of digital knowledge amid digital society, politics, culture, and economy,” and he recommends a number of activities toward this end, including (for example) studies on the differences between popular knowledge and “high” expertise. “All these cycles of activities would have in common is the goal of sifting the sands of the digital for the unique quality, or quantum, that is digital knowledge,” he writes.[31]

The wager of my project is that there exists no specific property which exists across all bodies of digital knowledge while simultaneously remaining within the exclusive ambit of digitality. That is, there is no unique “quality or quantum” of digital knowledge, at least in the sense that “quality or quantum” denotes general features or attributes, in other words, properties which may be confirmed by multiple sources. It is only from this anti-positivist perspective that the social stakes of the data episteme become clear. The ideal of the data episteme is to discredit epistemic informants which do not withstand positivistic analysis. Thus its effects on knowledge do not manifest as explicit features or signatures, but rather as a series of exclusions.

[30] Liu, “Theses on the Epistemology of the Digital”
[31] Liu, “Theses on the Epistemology of the Digital”

**Data and the "End of Theory"**

At this time, multiple categories of digital knowledge problems have been documented. Liu's case of disintegrating knowledge-standards categorically encompasses several such conundrums. There is also the exclusion of statistical outliers by computational probabilistic techniques, along with the notion of the "end of theory," which was the subject of an eponymous article penned in 2008 by Chris Anderson, then editor-in-chief of popular technology magazine *WIRED*.[32] Although they are well-known on their respective terms, the conceptual threads which run between these problems are largely undertheorized. As it were, the framing of these problems as issues for politics, economy, culture, and other discrete frameworks restricts access to their common theoretical ground. Epistemological analysis enables researchers to view various digital knowledge problems in the broader context of the data episteme. In chapter two, I expand on the properties of digital data which permit datagenic technologies to insidiously and systematically promote specific criteria for scientific validation. Here, I will emphasize that digital knowledge problems may appear intractable if scholars do not consider that data influence the structural definition of knowledge.

Anderson's article points to several of the epistemic criteria advanced by digital and data-intensive methods. Among its other allegedly "unique" affordances, he claims that the Big Data allows mathematics to claim intellectual superiority over all other methodological approaches:

> This is a world where massive amounts of data and applied mathematics replace every other tool that might be brought to bear. Out with every theory of human behavior, from

[32] Chris Anderson, "The End of Theory: The Data Deluge Makes The Scientific Method Obsolete," June 2008. https://www.wired.com/2008/06/pb-theory/

> linguistics to sociology. Forget taxonomy, ontology, and psychology. Who knows why people do what they do? The point is they do it, and we can track and measure it with unprecedented fidelity. With enough data, the numbers speak for themselves.[33]

This particular passage from "The End of Theory" has been widely criticized for its rigid and polemical vision of intellectual work. In his essay "The Data/Theory Thing," philosopher Geoffrey Bowker disputes Anderson by noting the intrinsic behaviorist and positivist assumptions behind the allegation that theory has "ended."[34] Bowker's article speaks directly to the role of positivism in digital epistemology. Considering the fact that Comtean positivism has been challenged by scholars across all disciplines— including, especially critical social and technology studies researchers — Anderson cannot defensibly make claims to either universality or inscrutability.[35] I would add that if such an emphasis on positivism is foregone, digital paradoxes of knowledge may appear irreconcilable. As feared by Liu, all claims to epistemic legitimacy would appear to be under threat.

**Psychedelic Science As/And Methodology**

To figure scientific research and practice protocols as critique is, in effect, to use methodology as method.[36] This technique finds precedent in the work of critical theorist Theodor Adorno, who is

[33] Anderson, "The End of Theory"
[34] Bowker, "The Data/Theory Thing"
[35] Including, especially, scholars associated with The Frankfurt School, including Theodor Adorno and Max Horkheimer.
[36] I use the term "methodology" in the sense defined by the Merriam-Webster Dictionary: "a body of methods, rules, and postulates employed by a discipline: a particular procedure or set of procedures." See *Merriam-Webster Dictionary, s.v.* "methodology," https://www.merriam-webster.com/dictionary/methodology

widely acknowledged for his critical exhortations against positivism. In 1961, Adorno famously debated philosopher of science Karl Popper, who is well-known for promoting falsifiability as a precondition of epistemic validity. In "The Popper-Adorno Controversy: The Methodological Dispute in German Sociology," philosopher David Frisby presents their conflicting viewpoints:

> Once a specific problem has been selected, Popper insists on the primacy of the methodology to deal with that problem. Adorno questions whether methods do not rest upon methodological ideals but rather on the facts studied. It is certainly the case however that in the social sciences those objects of study are selected which may be handled by existing methods. That is, methodology assumes primacy over relevance.... Central to Popper's methodological prescriptions are concepts such as hypotheses and testability. Adorno not only asks whether these may be legitimately transferred from natural science methodology but further suggests that social laws are incommensurable with the concept of hypotheses. Thus the logical method of reduction of an entity to its elements, out of which the hypotheses are constructed, virtually eliminates objective contradictions.[37]

This passage implies that, by positivistic standards, knowledge which cannot be obtained through available methods would necessarily be denied entry into epistemic canons. Adorno sought to demonstrate that this also works the other way around: if scholars do not acknowledge the existence of that which cannot be determined by presently available methods — that is, if they do not self-reflexively acknowledge that their means are limited — they can only hope to

[37] Comte, *A General View of Positivism*, 26.

reproduce "known knowledge." Adorno suggests as much in his assertion that methods rest upon "facts studied" rather than ideals.

To be sure, my project evaluates literature not from sociology, but psychiatric research and practice with psychedelics. While psychedelic science has always crossed traditional disciplinary bounds, it is most accurately described as a "psy" field — meaning that it is closer to psychiatry, psychology, and neuropsychopharmacology than it is to sociology.[38] However, the Foucauldian episteme is agnostic towards such disciplinary constructs. The "fields of scientificity" to which Foucault refers transcend the contemporary institution of STEM (Science, Technology, Engineering and Math), as well as what is conventionally known as the "hard sciences." "Scientificity" instead denotes a certain authority determined by complicity with epistemic criteria. One might say that "scientificity" does not follow from an "episteme," but that the two are mutually constitutive. Adorno's methodological insights therefore apply to any field of knowledge production which aspires to scientificity, including both sociology and psychedelic science.

Chapters four and five describe the ways in which psychedelic experience refutes positivistic hermeneutics. As a prefatory summation, I will turn to the psychedelic scholar Luke Williams' thesis "Human Psychedelic Research: A Historical and Sociological Analysis," in which he comments on the difficulty associated with studying psychedelic experience using conventional scientific means. As Williams writes,

> Studies done into the psychological effects of psychedelic drugs present interesting problems not present in mainstream science or in animal studies of psychedelic drugs.

[38]See Nikolas Rose, *Inventing Our Selves: Psychology, Power and Personhood.* Cambridge, UK: Cambridge University Press, 1998.

> These problems centre around the subjective nature of the psychedelic experience. The problems encountered in psychological research of the intrinsic unrepeatability of certain experiments is here multiplied many times over: the effect of any hallucinogenic drug not only varies widely from person to person, but is extremely dependant [sic] on the "Set and Setting" of the user.[39]

The subjective and allegedly "unrepeatable" quality of psychedelic experience has led certain researchers to intervene in the rote application of quantitative and digital methods in psychedelic inquiry. Literature scholar Neșe Devenot has suggested that her colleagues in the psy- sciences should include interpretative qualitative frameworks and speculative approaches in the design and interpretation of psychedelic research trials. Devenot is expressly interested in methods informed by literary theory, but she is joined by scholars who emphasize the potential contributions of theology, philosophy, rhetoric, anthropology, queer theory, and indigenous studies, among other disciplines. These scholars include but are by no means limited to the anthropologists Nicolas Langlitz and Beatriz Labate, public health researcher Kenneth Tupper, philosophers Oli Genn Bash, Raphaël Millière, Phillip Gerrans and Christopher Letheby, psychiatrists Alexander Belser, Elizabeth Nielson, Jeffrey M.Guss, and Eduardo Ekman Schenberg, and the rhetorician Richard Doyle. My analysis is anchored in their research, along with the work of many like-minded others within and beyond the disciplines listed above.

In her doctoral dissertation "Altered States/Other Worlds: Romanticism, Nitrous Oxide and The Literary Prehistory of Psychedelia," Devenot explores narratives from self-experiments with nitrous oxide performed by eighteenth- and nineteenth-century romantic poets. Here, she

[39] Luke Williams, "Human Psychedelic Research: A Historical and Sociological Analysis." Undergraduate Thesis, Cambridge University, 1999.

assesses one such report from the chemist Humphry Davy, which counts among the earliest documented endeavors to scientifically assess the effects of mind-altering substances on consciousness. Devenot provides the following commentary on Davy's testimony:

> Although [for Davy] dependent variables like temperature and pulse could be recorded objectively with the aid of thermometers and clocks, the 'data' resulting from the subjective experiences of these human trials existed on the level of language alone: the lived experiences needed to be translated into language form. The perceived novelty of these experiences —a quality insisted upon time and again by different subjects — posed special challenges to this process.[40]

Devenot's project historically contextualizes the call for non-positivistic approaches in psychedelic psychiatry from the twentieth and twenty-first centuries. Psychedelic science literature shows that novelty, ineffability and dependence on immediate environment are frequently referenced across self-reported narratives from those who have ingested psychedelics. As I explain in chapter four, these qualities are consistent across the documented history of psychedelic drug use.

Considering its dependence on immediate environment and its tendency to catalyze hallucinations, alterations in emotional and cognitive processing, and the genesis of what some scholars have called "non-conceptual" knowledge, psychedelic inebriation appears to yield an encounter of a distinctly *Gestalt* character.[41] In other words, the phenomenology of psychedelic

[40] Neşe Devenot, "Altered States/Other Worlds: Romanticism, Nitrous Oxide and The Literary Prehistory of Psychedelia," 2015, 44.
[41] See, for example, Michael Pollan, *How To Change Your Mind: What The New Science of Psychedelics Teaches Us About Consciousness, Dying, Addiction, Depression, and Transcendence*, 333.

palliative mechanisms would supersedes the sum of their parts. Psychedelic experience would thus resist reduction to variable components in the service of constructing hypothesis tests, and so could not be scientifically evaluated using Popper's methodological approach. Any study into the palliative function of psychedelic phenomena would have to take its Gestalt characteristic into consideration. This characteristic is a key component of my argument regarding the incommensurability of psychedelic psychiatric functions and datafication process. If psychedelic experience cannot be articulated as testable variables, it also cannot be expressed in the form of digital data.

**Defining Data for Theoretical Critique**

My presentation of psychedelic science as resisting expression in digital data, and therefore as a challenge to the data episteme depends on a rigorously technical definition. Stated summarily, I take the singular "datum" to denote a unit of digital computation rather than a vehicle for any and all information or epistemic material. This technical conceptualization may appear anomalous in a study which favors theoretical over empirical inquiry. To elaborate on my usage of "data," I will turn to philosopher Alexander Galloway. In his essay "From Data to Information," Galloway indicates that the etymological origins of the word "data" bears out a connection between facticity (the quality of being factual), and the positivistic capacity for measurement. As he explains,

> *Data* comes from the Latin *dare*, meaning to give. But it's the form that's most interesting. First of all, it's in the neuter plural, so it refers to "things." Second, *data* is a participle in the perfect passive form. Thus the word means literally "the things having been given." Or, for short, I like to think of data as "the givens." Data are the things

> having been given. Using the language of philosophy, and more specifically of phenomenology, data are the very facts of the givenness of Being. They are knowable and measurable. Data display a facticity; they are "what already exists," and as such are a determining apparatus.[42]

As it were, Galloway's interpretation of "data" could be taken to indicate that there is something redundant about the phrase "data episteme." Understood strictly as "that which is knowable," the phrases "data" or "Big Data" would already denote the totality of knowledge. The epistemic impact of major quantitative expansions in data would amount to an increase in degree as opposed to a shift in kind or principle. But although Galloway depicts data as always knowable and measurable, he does not assert that what is knowable and measurable is also always data. In other words, "knowledge" surpasses the rote designation of "data." For Galloway, all data is knowledge, but not all knowledge is data. More importantly, Galloway deploys a conventional usage of "data" which has limited theoretical purchase in studies which exclusively examine digital computing.

I maintain that the technical definition of data has not been adequately emphasized in technology studies because it is rarely disambiguated from this expansive, colloquial definition. A more complete account would reveal computational instrumentality as a major component of the relationship between knowledge-power and digital epistemology. Thus I will provide an extended reflection on the term "data" so as to clarify its role in advancing the functions of knowledge-power. My reflection on the term "data" departs from the work of new media theorist Wendy Chun, who has made similar arguments about the words "algorithm" and "software."

---

[42] Galloway, "From Data to Information," 2015

At the outset of her essay on "On 'Sourcery, or Code as Fetish," Chun recounts the ancient fable of the six blind men and an elephant.[43] In the story, each man touches a separate part of an elephant and describes it differently as a result. One likens the elephant to a wall; others say it is more like a spear, tree, palm or piece of rope. Each man believes his understanding to be accurate and the others' flawed. Chun argues that new media scholars face a similar predicament:

> It is perhaps profane to compare a poem on the incomprehensibility of the divine to arguments over new media, but the invisibility, ubiquity, and alleged power of new media (and technology more generally) lend themselves nicely to this analogy. It seems impossible to know the extent, content, and effects of new media. Who knows the entire contents of the WWW or the real extent of the Internet or of mobile networks? How can one see and know all time-based, online interactions? Who can expertly move from analyzing social-networking sites to Japanese cell-phone novels to World of Warcraft to hardware algorithms to ephemeral art installations? Is a global picture of new media possible?[44]

"On 'Sourcery'" is, as she writes, a "sympathetic interrogation" of Software Studies, which was a nascent area of inquiry within media studies at the time of publication. Chun suggests that this subfield flourished as a result of the fact that software might be thought as a common denominator among new media. "All new media allegedly rely on — or, most strongly, can be reduced to — software, a 'visibly invisible' essence," she writes. "Software seems to allow one

[43] Wendy Chun, "On Sourcery," 299.
[44] Chun, "On Sourcery," 299-300.

to grasp the entire elephant," she writes.[45] In fact, what is important in her analysis is not software's actual ubiquity — which she contends is dubious — but rather its figuration as a common thread among multiple different technologies. In this sense, its omnipresence is a productive mirage: software seems to allow one to grasp the entire elephant, so to speak. It is thus attractive as a lens for new media scholars as they attempt to gather multiple technical and social artifacts into a single field of vision.

Scholars within the currently emerging field of Critical Data Studies (or CDS) maintain that data is a societal constituent. I argue that before data serve as social infrastructure, they are discrete computable integers, or inherently meaningless entities onto which symbolic and epistemic meaning is transposed. Data are intrinsically distinct from their functional significations, which are always multiple and mutable. Additionally, and more importantly for my project, data may serve as the sole common thread that runs among all forms of digital technology. While media and cultural theorists, computer scientists, and philosophers might disagree on an exact definition of "digitality," they accept discreteness as its fundamental feature.[46] The digital is, in this sense, intrinsically discrete. Data technologies always use finite and discontinuous values to access, represent, and manage information. Stated most simply, digital technology is data technology.

The title "new media" is often applied to scholars unwittingly. In their book *Life After New Media: Mediation as Vital Process*, media theorists Sarah Kember and Joanna Zylinska claim that "the majority of the theorists who have used this term have always done so somewhat

---

[45] Chun, "On Sourcery," 300.

[46] See M. Beatrice Fazi, *Contingent Computation*, 24: "While media and cultural theorists, computer scientists, and philosophers might disagree on an exact definition of 'digitality', they accept discreteness as its fundamental feature. The digital is, in this sense, intrinsically discrete or, in other words, characterised as a data technology that uses discontinuous values to access, represent, and manage information."

reluctantly, with a sense of intellectual compromise they are having to make if they want their contribution to be recognized as part of a particular debate around technology, media and newness."[47] They also assert that Chun's self-identification with the phrase "new media" is self-reflexive. Kember and Zylinska suggest that Chun takes the label of "new" media as a point of departure, describing the ostensive "singular uniqueness" implied by the word "new" as a myth that Chun aims to undo.[48]

As a descriptor, "newness" may indeed do little but conceal a dearth of similarities among contemporary media forms. Like Chun, however, I do not accept the apparent lack of internal unity that would give "new media" categorical coherence. There is a reason why the phrases "new media" and "digital technology" are often used interchangeably — although their conflation belies an absence of cross-disciplinary consensus on these terms' official or "textbook" meaning. This dissensus, I argue, should not be taken as a major problem. In fact, it reveals something very crucial about digital phenomena. If there are no empirical commonalities that bind all digital or "new media" artifacts, we can only think about "new media," "data," "digital technology," and so on, with metaphors developed for this express purpose.

Central to Chun's analysis is the popular but, as she writes, misconceived notion according to which software interfaces are viewed as the singular and scientifically inevitable outcome of their source code. She offers that scholars should instead consider such an assumption concerning the connection between code and software as fetishistic, whereby that word "fetishistic" implies a process by which causality is inferred from desire as opposed to reason. As she writes, "software as source relies on a profound logic of 'sourcery' — a fetishism

---

[47] Sarah Kember and Joanna Zylinska, *Life After New Media: Mediation As A Vital Process* (Cambridge, MA: The MIT Press, 2012), xiv.
[48] Kember and Zylinska, *Life After New Media*, xiv.

that obfuscates the vicissitudes of [code] execution … the relationship among code and interface, action and result, however, is always contingent and always to some extent imagined."[49] Chun insists that the strength of Software Studies lies in its tendency to point up the fact that humanity's relationship with technology is largely imagined. As such, the subfield should explicitly reveal the muddying function of fetishistic reason. It may appear strange to celebrate the foundational role of mystification in any scholarly field. But a deemphasis on software *qua* software draws attention to the necessary place of metaphor and creative thought—fundamentally, acts of language — in human engagement with the digital. These insights represent the cornerstone of Chun's conception of Software Studies.

Data may play a similar role to Chun's "software," although there exists a very important difference between the two. As with Software Studies, a primary function of social inquiries into data should be to clarify the role of interpretation and imagination in scholarly apprehension of new media. However, if the overarching goal is to excavate digital technologies from their varying contexts so as to better evaluate their impact on human life, data is a more useful lens than software. To explain why this is so, it is necessary to offer a clear technical definition of "data." The benefit of using data as a basis on which to organize thought on the instrumental effects of digitality cannot be understood by studies that only illuminate its exogenous effects—which, in fact, describes the majority of existing CDS projects. While these studies are very helpful, they must be supplemented with the technical definitions of data employed in the discipline of computer science.

My argument might appear to suggest that Chun was incorrect in tying the role of imagination to any understanding of new media. The empirical truths of data and digital

[49] Chun, "On Sourcery," 310.

technology would seem to withstand human interpretative intervention. However, if one were to subscribe to this belief, one would miss the fact that human beings invest data with epistemic power by an imaginative consensus concerning their meaning and purport. This insight, in turn, suggests why a technical definition of data becomes important for a critique of positivist digital epistemology. As the basis for all signifying language acts in computer systems, data is the eminent sign form of the digital age. I reference Jean Baudrillard's notion of the sign value form, which he conceptualized to describe how signifying media are turned into capital.[50] Baudrillard contends that through the sign value form, signifying media — very much including data — are understood as equivocal with financial worth or capital.

In this sense, capital becomes valuable through acts of imagination — the mental process by which, for example, ten dollars is translated as an item of clothing or food. Data also become valuable through imagined resemblances. Rendered by the interpretative functions of a programming language, data are constructed to resemble human language, visual imagery, sound and so on. Data and capital are virtual and immaterial entities. Analogical cognitive leaps, the actions that make something appear as functionally similar to something else, are required if humans are to come to believe that they are interchangeable with tangible phenomena; e.g., data becomes akin to human language and ten dollars can be seen to relate to a t-shirt. At a structural level, a positivistic consensus on the imagined meaning of data is the means by which data are reified, and by which digital technology and its key product, knowledge, become a significant economic force.

[50] Jean Baudrillard, *For A Critique of the Political Economy of the Sign*

**Datafication, Discretization, and Grammatization**

As previously mentioned, a number of scholars have demonstrated the positivist leanings of most digital studies. Critical theorist Christian Fuchs is especially concerned with the effects of positivism on social investigations of the Internet. In his article "From digital positivism and administrative big data analytics towards critical digital and social media research," he remarks on the tendency of digital positivism to "advance an 'absolutism of pure [digital, quantitative] methodology,'" which in turn promotes "an 'immunization of the [Internet] sciences against philosophy.'"[51] In his attempts to demonstrate the limits of strictly positivist methods, Fuchs advocates for Internet scholars to move away from quantitative digital analytics in favor of more critical and self-reflexive techniques.

While Christian Fuchs and Alexander Galloway engage data in very different ways, their work is reconcilable. To briefly reiterate, Galloway provides an etymological assessment of "data" that calls forth a theoretical continuity between its historical and modern usage. Fuchs, on the other hand, decries the overuse of digital metrics in social research on the Internet. In Fuchs's viewpoint, data provide tools for inquiring into online social and cultural phenomena. These tools are defined by the limited scope of their affordances, and, as Fuchs asserts, as typically deployed at the cost of a more holistic understanding of online social phenomena. By contrast, Galloway views data as a specific category of knowledge, and he attempts to theorize its connection to related knowledge-categories, such as "information."[52] For Galloway, these linkages must be articulated before data can be properly assessed as phenomena of modern computation.

[51] Christian Fuchs, "From digital positivism and administrative big data analytics toward critical digital and social media research!" *European Journal of Communication* 2017, Vol. 32, no. 1 (2017), 40.
[52] Alexander Galloway, "From Data to Information," 2015

I draw from both Fuchs and Galloway to suggest that a technical definition of data is essential to any critique of digital epistemology as a social and political problem.Thus I will offer an extensive, if straightforward, technical definition: data are material that can be processed and transmitted by electronic computer systems. As Galloway notes, "data" is a plural noun; the singular of "data" is "datum." In binary computing systems, a "datum" is either the binary digit zero or one and ones, also known as "bit" (which is an abbreviation of "binary digit"). Data are measured in groupings of bits. Eight bits comprise a byte. A gigabyte contains 8,589,934,592 bytes. To return to the opening paragraph, the global quantity of data is expected to ascend to forty trillion gigabytes of data. Perhaps, then, the term "Big Data" is warranted.

While some recent scholarship has portrayed Big Data as the cause of an "epistemic paradigm shift," scale is not fundamentally relevant to the relationship between data and knowledge.[53] My definition of "data" as "discrete integers" allows me to identify positivistic expression and discretization as the definitive functions of the data episteme. Data produce and are produced by expression and discretization regardless of the quantity in which they come. The smallest amounts of data still advance the data episteme.

Digitization is the process of turning non-computable matter into digital data. Digitization may be considered a process of discretization, or the means by which variables become discrete, that is, noncontinuous, distinct and measurable. In other words, digitization entails the delimitation or circumscription act which introduces finitude to continuous variables, or variables which contain a theoretically infinite quantity. To digitize/discretize/datafy is to make systematic incisions into continuous phenomena. This process transforms these phenomena from

[53] See Rob Kitchin, "Big Data, New Epistemologies and Paradigm Shifts." *Big Data & Society* 1, no. 1 (2014), 1-12.

continuously integrated entities into an amalgam of atomized and finite parts — a disintegrated but still structurally fused composite.

Discretization produces the digital. According to the Merriam-Webster dictionary, "digital" means both "composed of data in the form of especially binary digits" and "of, relating to, or using calculation by numerical methods or by discrete units."[54] The idea of "the discrete" has been embraced by several theorists of digital computation. In her book *Coding Literacy: How Computer Programming Is Changing Writing*, English scholar Annette Vee suggests a link between discretization as the basis of modern computing and global changes in writing practices after the advent of digital computing.[55] Alexander Galloway, meanwhile, has discussed the connection between discretization and aesthetic fidelity "loss" in great detail.[56] Vee's and Galloway's research is prefigured by the work of philosopher Bernard Stiegler, whose theorization of the discrete departs from philosopher Jacques Derrida's notion of "the gramme." In his essay "Grammatization: Bernard Stiegler's Theory of Writing and Technology," rhetorician John Tinnell describes the link between Stiegler's concept of "grammatization" as a specific form of "discretization" and Jacques Derrida's "gramme." As Tinnell writes,

> Stiegler's [grammatization] can be understood as the latest advance in the field of grammatology, which commonly aims to theorize emerging media parallel to the history and theory of writing (broadly conceived to include virtually any act of technical inscription). Stiegler, even more than Derrida, professed to see life in the world — human becoming, historical change, social organization — as the evolution and play of *gramme*

[54] *Merriam-Webster Dictionary, s.v.* "digital," https://www.merriam-webster.com/dictionary/digital
[55] Annette Vee, C*oding Literacy: How Computer Programming Is Changing Writing.* (Cambridge, MA: The MIT Press, 2017)
[56] Alexander Galloway et al., "Compression in Philosophy." *Boundary 2* 44, no. 1 (May 2017): 125–47.

> (the Greek word for "written mark"). What atoms are to physicists, grammes are to Stiegler. On the basis of Derridean grammatology, we can gain a sense of what grammatization signifies in Stiegler's work. The term applies to processes by which a material, sensory, or symbolic flux becomes a gramme, which—broadly conceived—can include all manners of technical gestures that maintain their iterability and citationality apart from an origin or any one particular context.[57]

Here, I specify digital data as always the outcome of grammatization processes. Thus data as discrete integers are technical gestures that, across contexts, maintain their iterability and citationality, which I take to mean their ability to incorporate other data and to serve as epistemic informant. Data assemblages, as structural assemblages of these gestures, are ontologically and epistemically homogenous.

I do not attribute specific characteristics to the epistemic fluxes which data grammatize. Rather, I assert that the qualia of epistemic content — their continuous fluxes — are excluded by the grammatizing process. The data episteme does not allow these fluxes to be conceived of as knowledge. These qualia, as resolutely continuous, do not succumb to the power of digitization. Here, Tinnell explains how various technologies have grammatized/digitized their subjects, and in so doing, violated them. He writes:

> For Stiegler, the shift from cuneiform to phonetic symbols is a process of grammatization, the shift from hand-tools to factory machines is a process of grammatization, and so is genetic engineering—cells and organs become replicated and

[57] John Tinnell, "Grammatization: Bernard Stiegler's Theory of Writing and Technology," *Computers and Composition* 37 (2015), 135.

> revised like a kind of alphabet. In every case, a continuous flux (e.g., speech, the body, the genome) becomes broken down into a system of discrete elements (e.g., alphabetic characters, mechanical systems, recombinant DNA sequences). And, in every case, the latter's emergence always disrupts, transforms, and reconfigures the former.[58]

As I have stated, I am more interested in the instrumentality of the *gramme* in relation to continuous fluxes than I am in the essential properties of the flux. As Tinnell notes, his interpretation of what Stiegler intended by "gramme" is somewhat broad. In the above excerpt Tinnell proposes that grammes "might include" technical gestures, but he does not reveal any intrinsic nature beyond this specific instrumental capacity. Taking Tinnell's definition nevertheless as complete and workable, I focus on the technical gesture enclosed within a digital gramme. These gesturing movements appear to function much in the same way as Baudrillard's simulacra as detailed in his book *Simulacra and Simulation*.[59] The gesture simulates presence, even if it is not necessarily approximate to what Baudrillard in *Simulacra and Simulation* calls "basic reality."

Stiegler's *gramme* and Baudrillard's simulacrum can both be connected to philosopher Jacques Derrida's concept of "trace." In her preface to Derrida's *Of Grammatology*, literary theorist and translator Gayatri Chakravorty Spivak asserts that "the structure of the sign is determined by the trace or track of that other which is forever absent. That other is of course never to be found in its full being… Derrida, then, gives the name trace to the part played by the radically other within the structure of difference that is the sign."[60] The "radically other" which is

[58] Tinnell, "Grammatization," 136
[59] Jean Baudrillard, *Simulacra and Simulations* trans. Sheila Faria Glaser. (Ann Arbor, MI: University of Michigan Press, 2018)
[60] Jacques Derrida, *Of Grammatology*, xvii.

"forever absent" — and which is also, possibly, near to Baudrillard's "basic reality" that is not a positivity but rather exclusively marked as a distance from the sign — has no existence in digital data. Intelligibility and utterability exist in negative relation to the radically other, and yet this relationship is crucial. Negations establish the border of both thought and knowledge, which are contingent upon the other for their own coherence and meaning.

In my project, I perform a close reading of literature from psychedelic science as a substantiation of the negative aspects of thought, which I finally call "the idiosyncratic." The theoretical justifications for the use of non-digital methodologies in psychedelic science reveal, in some cases explicitly, a commitment to a psychological view which affirms the critical role of function of the idiosyncratic. This is the most significant ways in which psychedelic science refutes the data episteme. To reiterate, I do not make any attempt to describe or affix characteristics to that which falls beyond the scope of computability, nor do I retrieve a particular "quality or quantum of digital knowledge," as Alan Liu might desire. Rather, I point to certain phenomena which data cannot mediate. The specific negations I posit constitute a basis for a general theory of data's epistemic effects.

**Critical Data Studies and Epistemic Limits**

Between the years 2014 and 2017, a number of articles were published declaring the need for a transdisciplinary field devoted to the study of data beyond the boundaries of STEM.[61] These articles often depict the theoretical and empirical issues of data as not only confounding disciplinary bounds but also general academic orthodoxy. Most initiatives under the banner of

[61] See, for example, Rob Kitchin et al., "Toward Critical Data Studies: Charting and Unpacking Data Assemblages and their Work" (2014) and Craig M. Dalton et al., "Critical Data Studies: A Dialog on Data and Space" (2016)

Critical Data Studies have not distinguished institutional settings for knowledge production as meaningfully separate from another. For example, CDS scholars generally do not treat the effects of data on research done in universities as distinct from their impact on corporate or private-sector analyses. The rationale maintains that such a reduction would run the risk of confining the problems of data to the one particular arena, and in so doing, preempt studies on the relationship between digital epistemology and disciplinary orthodoxy.

I affirm this position, in large part because the effects of positivist bias are essentially the same regardless of the quantity of data. For this reason, I do not characterize the birth of Big Data as a major shift in the history of knowledge after Comtean positivism. As I have stated, however, the teleological goal of the data episteme is to intellectually discredit non-positive phenomena. However, the acceleration of digital epistemic quantia is increasing the speed at which knowledge production must ultimately come to terms with a horizon of positive intelligibility. Big Data is making it increasingly difficult to ignore the epistemic problems of positivism, and the need for commensurate critical interventions is growing more urgent in turn.

Epistemology has always been a central concern of Critical Data Studies. In their 2016 article "Can We Trust Big Data? Applying Philosophy of Science To Software," communication theorists John Symons and Ramón Alvarado ask scholars to consider theoretical and historical precursors to digital epistemology. They specifically invoke the work of physicist Evelyn Fox Keller. Here, they write that Fox's twentieth-century scholarship portends the problems of digital computing in the new millennium:

> Although there is a broad debate in philosophical literature about the epistemic implications of the 'introduction of computers' into scientific inquiry, it is important to recognize, following the work of Evelyn Keller, that this introduction took place

> gradually in a series of distinguishable stages from the end of the Second World War until relatively recently.[62]

They proceed to summarize Keller's research on the history of computational methods in scientific analysis, which Keller claimed took place in identifiable stages. The inaugural stage followed the rise of computing after World War II. At this time, digital tools fled from military laboratories and were used in academic and industrial settings to solve calculus equations that had proved too complex for earlier technologies. The second stage is defined by the birth of computational modeling. At that time, Symons and Alvarado write,

> scientists were no longer merely simulating possible solutions to differential equations but rather working under an assumed isomorphism between the observed behavior of a phenomenon and the dynamics expressed by the artificial system, or computer model, constructed to track its idealized development. In other words, the aim was to simulate "an idealized version of the physical system.''[63]

In Keller's third stage, scientists began to deploy computational analytic and modeling techniques to investigate context-specific, non-general systems. "According to Keller," Symons and Alvarado write, "[the third stage] departs from the first two in that it 'is employed to model phenomena which lack a theoretical underpinning in any sense of the term familiar to physicist.'"[64]

---

[62] John Symons and Ramón Alvarado. "Can We Trust Big Data? Applying Philosophy of Science to Software." *Big Data & Society* 3, no. 2 (2016): 6.
[63] Symons and Alvarado, "Can We Trust Big Data?," 7.
[64] Symons and Alvarado, "Can We Trust Big Data?," 7.

Symons and Alvarado point out that the chronological trajectory of Keller's stages does not necessarily bear out as linear intellectual progress. That is, today's researchers recognize the validity of methodological approaches associated with all three, and often blend them. They add that Big Data techniques lie between first and second stage, and add that Big Data specifically supports "a software intensive enterprise that is focused on revealing patterns that can be used for commercial, political, or scientific purposes."[65] Their observations echo Chris Anderson's argument in"The End of Theory," where Big Data appears to undo the moratorium on correlation-based techniques. In other words, Big Data permits correlation to equate to causation. The embrace of the correlation appears to be responsible for making theory redundant. In "Can We Trust Big Data?," Symons and Alvarado suggest that Anderson's anti-theory stance is not new but rather dates to pre-Enlightenment philosophies of science, such as the notion that the Earth is at the center of the universe, which similarly looked to correlation as a form of explanation.

"Can We Trust Big Data?" suggests the need for technical specificity in critical studies on digital data. Without such specificity, Big Data might simply be seen as the return of pre-Enlightenment philosophies of science. Countering this view, however, I maintain that digital epistemology must be centered on the relationship between discretization, positivism, and the epistemic problems borne by digital computing. The data episteme implies the universal fungibility of all phenomena and so produces epistemic norms in accordance with the virtue of universal commensurability. It thus denies the existence of all non-digitizible phenomena.

[65] Symons and Alvarado, "Can We Trust Big Data?," 7.

**Epistemic Limits as Political Effects**

I return to the idea of universal fungibility to emphasize that the digital epistemic "horizon" is a manifest product of the data episteme. This point is perhaps underrecognized in scholarship on digital epistemology. In his essay "Digital Knowledge: Format, Scale, and the Information-Knowledge Parallax at the Total Knowledge Horizon," which was intended as a reply to Alan Liu's theses on the epistemology of the digital, historian Peter De Bolla argues that Liu's designs for digital epistemology are based on a conservative view of scholarship which excludes what De Bolla calls "distributed knowledge production."[66] De Bolla views his work as more supportive of a "future humanities scholarship" which has "shed the protective skin of the 'discourse model,'" which refers to a style of humanities research which emphasizes "interpretation and critique" performed by individual scholars.[67] This approach, he writes, should be superseded by "collective and collaborative enterprise distributed in expansive networks of communication and experimentation."[68] In De Bolla's words,

> This, to my mind, will not be humanities 2.0 (or some such) but *digital* knowledge work. In this domain interpretation and critique are no longer centre stage (though there will be no necessary reason to jettison them entirely), occupying the foreground will be information, its gathering and manipulation so as to reveal what knowledge lies within the quantum level of information as data.[69]

[66] Peter De Bolla, "Digital Knowledge: Format, Scale, and the Information-knowledge Parallax at the Total Knowledge Horizon — A Reply to Alan Liu." Last updated 15 November 2014. http://liu.english.ucsb.edu/peter-de-bolla-reply-to-alan-lius-theses-on-the-epistemology-of-the-digital/
[67] De Bolla, "Digital Knowledge."
[68] De Bolla, "Digital Knowledge."
[69] De Bolla, "Digital Knowledge."

He adds that, amid an abundance of data, the most urgent task for scholars is to select the correct tools of knowledge extraction. Because interpretation still has a function in De Bolla's framework, his approach is seemingly more inclusive than that of Chris Anderson. What remains problematic, however, is that the he corroborates the capacity to leverage "significant" knowledge — to discern signal from noise, as it were — as, ultimately, an objective and positivist measure of the worthiness of interpretation and critique. As he puts it:

> In a domain in which everything is potentially capable of finding relation with everything the task will be to sort out the noise from the significant signal. Although this may well involve building in the first sense above, it is as likely to involve building in the sense of conceptualising what digital knowledge might be at the "total knowledge horizon." That's the *thing* I hope we might aspire to build together.[70]

The presumption of infinite relatability fails to recognize the existence of the unequivocal. My project, by contrast, aims to depict psychedelic science as a compelling testimony for the existence of what might be called the unequivocal, or the singular, or the unique. In chapter five, I conceptualize this quality as "the idiosyncratic." Thus this dissertation is in some sense a vindication of "the idiosyncratic" as the object threatened by the normative power of data episteme, an episteme which seeks only to produce objects in its own image.

To conclude this introduction, I will present an outline which summarizes each chapter and indicates its role in the greater context of my project.

[70] Peter De Bolla, "Digital Knowledge."

**Outline of Chapters**

*Chapter II*

In this chapter, I argue that digitization processes subsume knowledge primarily by means of resemblance-making. I begin by examining Gilles Deleuze and Félix Guattari's concepts of the plane of immanence and the image of thought, and then posit the existence of an image of thought particular to the data episteme, which I call the "data image of thought." As I write, the data image of thought facilitates the expansion of the data episteme into the realm of thought and cognition. I then elaborate on the notion of data as sign value form, which was introduced in chapter one. My interpretation of data as a form of Jean Baudrillard's sign value denies data assemblages the capacity to subvert capitalist political economy. The remainder of the chapter presents examples from contemporary digital media which point to the fact that digitization processes always remake their subjects in the image of data. I conclude this chapter by stating that, while the image of data is always positive, thought and cognition are predicated upon negativity. Thus the data episteme cannot be made to resemble mentality. This conclusion prefigures chapter three, in which I more closely explore the function of the negative in human thought, and the relationship between negativity and psychedelic science.

*Chapter III*

In chapter three, I argue that a primary subject of the data episteme is the mental capacity for negation, or the function which recognizes incommensurability and non-resemblance. I draw from recent theoretical works that conceptualize political subjugation after Big Data as a function of cognitive exploitation, including Yann Moulier Boutang's *Cognitive Capitalism,* Byung-Chul Han's *Psychopolitics: Neoliberalism and New Technologies of Power,* Franco 'Bifo' Berardi's *The Soul At Work,* and Bernard Stiegler's *For A New Critique of Political*

*Economy*. I review this body of literature, highlighting elements that are most relevant to my claim along with significant points of disagreement. I then turn to contemporary research which investigates possible links between the digital campaign of cognitive exploitation and the mental capacity for abstraction. This includes but is not limited to work by media and cultural theory scholars Matteo Pasquinelli and McKenzie Wark. My contribution to the aforementioned discourses can be summarized as follows: the psychotherapeutic potential of psychedelic substances challenges the data episteme by restoring (or augmenting) the abstraction function.

*Chapter IV*

Chapter four provides a brief historiography of the documented study of psychedelic experience. It opens with a brief survey of eighteenth and nineteenth century self-experiments performed by Humphry Davies, Robert Southey, and Samuel Taylor Coleridge — what has been called the prehistory of modern psychedelic science. The chapter proceeds to explore methodological perspectives which prevailed following the rise of LSD research in the 1940s. I trace these techniques through the years immediately prior to the criminalization of psychedelics in the United States and Western Europe, i.e., the late 1960s. This chapter indicates that the epistemological complexities of psychedelic experience require a patent methodological strategy which supersedes the orthodoxy of established psy- fields. In other words, the study of psychedelic experience demands not a normative "science of psychedelics," but a "psychedelic science."

*Chapter V*

Chapter five develops the argument introduced at the conclusion of chapter four, which is that the scientific study of psychedelic experience cannot proceed as a "science of psychedelics," or a process which emphasizes the normative methodological standards associated with the data

episteme. Rather, it demands a specific "psychedelic science" which is designed to address the epistemological complexities of psychedelic phenomena. Psychedelic science presents an implicit critique of the data episteme in its attempts to resolve these complexities.

I begin by theorizing psychedelic science as a synthesis of conceptual elements introduced earlier in my project. I then review contemporary scholarship which argues that psychedelic science demands a departure from normative scientific epistemologies and related standards of research and practice. From there, I argue that, in its emphasis on singularity, alterity, and abstraction, psychedelic science presents a theoretical confound to the data episteme. I conclude chapter five by conceptualizing the quality of being unique or singular as "the idiosyncratic," and state that psychedelic science promotes idiosyncrasy as an epistemological virtue.

*Epilogue*

The epilogue examines the concept of the idiosyncratic through the lens of the Foucauldian episteme. Specifically, I explore the idiosyncratic through Foucault's *The Order of Things: An Archaeology of the Human Sciences*, where he exposes the contingent nature of all systems of epistemic legitimation. I also connect the idiosyncratic with contemporary research on the ubiquity of digital networks, or the notion that, as the poet Kenneth Goldsmith has stated, "if it doesn't exist on the Internet, it doesn't exist." My reading points up the intimacy between the idiosyncratic and negative thought, and the fact that both are violated by digitization.

## Chapter 2: Resemblance and the Digital Construction of Knowledge

*Rousseau and Lévi-Strauss are not for a moment to be challenged when they relate the power of writing to the exercise of violence. But radicalizing this theme, no longer considering the violence as derivative with respect to a naturally innocent speech, one reverses the sense of an entire proposition — the unity of violence and writing — which one must therefore be careful not to abstract and isolate.*

Jacques Derrida, *Of Grammatology*[1]

### Introduction: On the Imperceptibility of Data

There is an important similarity between knowledge and data: neither are essentially constituted by empirical properties. As such, they do not inhabit a perceptible form. Digitization processes may therefore appear to convey or mirror bodies of knowledge without altering them. The same cannot be said of aesthetic qualities, which are inclined to reflect the fact that they have been digitized. I use "aesthetics" in the same sense as M. Beatrice Fazi, a philosopher of media whose usage of "aesthetics," she writes, "is more in keeping with its etymological roots — which lie in the term *aisthesis* — and… is thus conceptualized as a theory of sensory knowledge."[2] Fazi adds that this meaning of "aesthetics" is invoked across contemporary theoretical debates on new

[1] Jacques Derrida, *Of Grammatology*, trans. Gayatri Chakravorty Spivak. (Baltimore, MD: Johns Hopkins University Press, 1976), 106.
[2] M. Beatrice Fazi, *Contingent Computation: Abstraction, Experience and Indeterminacy in Computational Aesthetics* (London: Rowman & Littlefield, 2018), 8.

media and digital phenomena.[3] I likewise take "aesthetics" to designate qualia capable of perception by the senses. Unlike data and knowledge, aesthetic phenomena are perceptible.

When content is transferred to or across digital substrates, its aesthetic character might change. Cases of digital "fidelity loss" demonstrate that data are not faithful to aesthetic forms. For example, the quality of a digital recording of music may differ from the auditory character of the performance in its immediate spatial and temporal context. By the terms of the data episteme, the processes by which bodies of knowledge are represented as data do not manifest empirically, and neither digitization would not appear to impact knowledge in any meaningful way. Digital capitalism exploits the capacity of data to assume the guise of knowledge with such a high degree of discretion.

In forthcoming chapters, I demonstrate that psychedelic science authorizes knowledge by virtue of criteria not recognized by the data episteme. I relatedly argue that digital methods are insufficient towards knowledge about the therapeutic benefits of psychedelics, and suggest that psychedelic research which conforms to the data episteme may lead to misinformed psychotherapeutic practice. In the present chapter, I illustrate digitization as a specific mode of knowledge production. I contend that digitization is an operation of resemblance-making, and I explore the ways in which the data episteme obviates epistemologies which account for difference and negation within and between bodies of knowledge. This chapter demonstrates that the economic and political power of data stems from their capacity to resemble or simulate positive phenomena.

[3] As Fazi points out, this meaning of "aesthetics" is distinguished from such traditional aesthetic concerns as beauty, taste, and genre. (Fazi, *Contingent Computation*, 8).

**Data and the Image of Thought**

By the terms of the data episteme, data constitute what philosophers Gilles Deleuze and Félix Guattari call the "plane of immanence." The plane of immanence, they write, "is not a concept that is or can be thought but rather the image of thought, the image thought gives itself of what it means to think, to make use of thought, to find one's bearings in thought."[4] The morphological figure of the "plane" evokes an encompassing state or condition that binds thought. As they put it, "concepts pave, occupy, or populate the plane bit by bit, whereas the plane itself is the indivisible milieu in which concepts are distributed without breaking up its continuity or integrity."[5] The plane is both condition and precondition for thought, continuously generating and enfolding concepts while remaining itself preconceptual. It is, to be sure, not a method: "every method is concerned with concepts and presupposes such an image," they write.[6] Stated differently, the plane of immanence does not determine or imply modes of activity. Per Deleuze and Guattari's schema, all activities rest on concepts which cannot serve as thought's precursors insofar as they always follow from thought.

The plane of immanence differs in accordance with various conceptual systems. Deleuze and Guattari observe that there are as many images of thought as there are modes of thinking and conceptualizing. As they explain,

> this intuitive understanding varies according to the way in which the plane is laid out. In Descartes it is a matter of a subjective understanding implicitly presupposed by the "I think" as first concept; in Plato it is the virtual image of an already-thought that doubles every actual concept. Heidegger invokes a "preontological understanding of Being," a

[4] Gilles Deleuze and Félix Guattari, trans. Hugh Tomlinson and Graham Burchell, *What is Philosophy?* (New York, NY: Columbia University Press), 35.
[5] Deleuze and Guattari, *What is Philosophy?*, 35.
[6] Deleuze and Guattari, *What is Philosophy?*, 37.

"preconceptual" understanding that seems to imply the grasp of a substance of being in relationship.[7]

Given its multiplicity and changefulness, it is not possible to characterize the plane of immanence by way of generality. It may only be described through a series of negations, as in Deleuze and Guattari's approach.

Among the many qualities and capacities they deny the plane of immanence, it is, they claim, not "a state of knowledge on the brain."[8] It may therefore appear that an epistemological philosophy would not imply an image of thought. The data episteme, however, does not conceive of knowledge as a "state," and does not recognize any dynamic of thought that might set it apart from a totality of knowledge. Instead, it establishes knowledge, thought, and the brain as immanent. The data episteme does not place knowledge over and above thought or the brain. Rather, it fuses knowledge, data, thought, and power to the point of undifferentiation.

Data determine that the plane of immanence is "laid out" (to use Deleuze and Guattari's words) in conformity with their own structural finitude and irreducibility. The image of thought nevertheless appears to be infinite. As Deleuze and Guattari write, "thought demands 'only' movement that can be carried to infinity;" meanwhile, "infinite movement or the movement of the infinite… constitutes the image of thought."[9] Digital capitalism surreptitiously delimits thought in complicity with the technical structure of data while maintaining, paradoxically, the image of infinity or limitlessness. Thus the image of thought becomes an alibi for the infinite expansion of capital into the realm of mentality. In other words, when thought becomes

[7] Deleuze and Guattari, *What is Philosophy?*, 40.
[8] Deleuze and Guattari, *What is Philosophy?*, 40.
[9] Deleuze and Guattari, *What is Philosophy?*, 37.

structurally limited, capital appears virtually infinite. The digital episteme permits capital to become a precondition of thought and to assume the positive form of infinity.

When data, knowledge, and capital establish the plane of immanence, they cannot be said to be "in motion." The state of being in motion implies a positionality subordinate to an encompassing spatial or temporal plane (as in the phrases "moving *in* time" or "moving *in* space," which imply that the dimensions of time and space envelop motion). As Deleuze and Guattari point out, "movement of the infinite does not refer to spatiotemporal coordinates that define the successive positions of a moving object and the fixed reference points in relation to which these positions vary," and thus "'to orientate oneself in thought' implies neither objective reference point nor a moving object that experiences itself as a subject and that, as such, strives for or needs the infinite."[10] The plane of immanence, then, makes no distinction between subject and object. It is simultaneously that which moves and motion itself. Subject and object, as conceptual rather than preconceptual phenomena, are *a posteriori* effects. The data image of thought does not construe capital as a subject of human thought, or place thought and capital in any relative relationship that might allow one to supersede the other.

Because the image of thought excludes preconceptual phenomena which might distinguish the singular from the universal, an image of thought presupposed by epistemology does not enshrine negativity or difference within or between bodies of knowledge. It instead proliferates that which is already manifest. Data, as "the givens," suffuse and affix to that which is already known.[11] Digitization amplifies sets of given qualia and quantia. For example, digital sound recording begets sonic properties, and digitized mathematical functions produce quantia.

---

[10] Deleuze and Guattari, *What is Philosophy?*, 37.

[11] Alexander R. Galloway, "From Data to Information." September 22, 2015. http://cultureandcommunication.org/galloway/from-data-to-information.

The characteristics of these outputs are always determined in advance of the act of digital production. Although digitization functions may change certain features of their inputs, or introduce other qualia or quantia, they do not fundamentally negate the properties which they are designed to replicate.

Negations, as it were, compass that which is absolutely unique, where "unique" means "absolutely singular or lacking in comparable phenomena."[12] Meanwhile, the word "idiographic" — "relating to or dealing with something concrete, individual, and unique" — expresses a relationship between the concepts of "the unique" and "the material." [13] Materiality, as concreteness or self-immanence, declares a lack of bondage which links a specific phenomenon to anything beyond itself. Digital epistemology, however, presupposes a divide between uniqueness, or materiality, and universality, or immateriality. This divide was famously substantiated by René Descartes in 1637, with jis *Discourse on Method*. Cartesian dualism remains central in Western thought to this day.[14] Crucially, the plane of immanence cannot exist by its conceptual terms, and so Cartesian dualism would not permit that the political power of data rest on the immanence of data with thought. The Cartesian position instead affirms the possibility of transcendence. If all possible material forms inhere to an imagined immaterial plane, the translation of the material, particular, or idiographic into or across digital media may appear not to violate unique properties. Such a belief system necessarily excludes the principle of incommensurability and negation by which phenomena might be considered unique. In this

[12] The Merriam-Webster dictionary gives the first definition of "unique" as "being the only one: sole." Its second definition is "being without a like or equal: unequaled." Negativity is essential to the conceptual coherence of "the unique. See *Merriam-Webster Dictionary, s.v.* "unique," https://www.merriam-webster.com/dictionary/unique

[13] *Merriam-Webster Dictionary, s.v.* "unique," accessed January 28, 2020, https://www.merriam-webster.com/dictionary/unique

[14] René Descartes, *Discourse on Method and Meditations on First Philosophy*, trans. Donald A Cress. (Indianapolis, IN: Hackett Publishing Company, 1998).

perspective, uniqueness is not defined as literally or radically singular or exceptional, and may be considered fully available to data.

Throughout this chapter, and those which follow, I subscribe to Deleuze and Guattari's non-transcendent perspective as opposed to the notion of Cartesian dualism. I will emphasize, however, that either framework might allow digitization to be conceived as a process of homogenization. Data, prior to their rendering as content or information, must abide by the technical rules of datafication/digitization, which determine that they are discrete and finite. This fundamental condition of digitality renders all digital phenomena ontologically alike in this sense. This sameness, of course, does not recuperate any transcendental unity breached by the fact of materiality and multiplicity, which permits objects to be constituted by their ontological distinctions and particularities. Digitality is already immanent with the material world, and is always available to worldly mechanisms of power. The regime in which data constitute knowledge is not separate from power and political economy. To say more about the entanglement of digital epistemology and capitalism, I will turn to Karl Marx and Jean Baudrillard.

**Data and the Sign Value Form**

In *Capital, Volume 1*, Marx describes a relationship between the economic value of commodities and what he conceptualizes as "use value." The use value of an object is, importantly, bound to its physical materiality. As he explains, "the utility of a thing makes it a use-value. Being limited by the physical properties of the commodity, it has no existence apart from that of the commodity. A commodity, such as iron, corn, or a diamond, is therefore, so far as it is a material

thing, a use-value, something useful." [15] Through the act of commodification, objects are rendered as commensurate by virtue of a shared relation to the common value form:

> Commodities come into the world in the shape of use values, articles, or goods, such as iron, linen, corn, &c. This is their plain, homely, bodily form. They are, however, commodities, only because they are something two-fold, both objects of utility, and, at the same time, depositories of value. They manifest themselves therefore as commodities, or have the form of commodities, only in so far as they have two forms, a physical or natural form, and a value form… Every one knows, if he knows nothing else, that commodities have a value form common to them all, and presenting a marked contrast with the varied bodily forms of their use values. I mean their money form.[16]

Commodification duplicates what Marx calls the "bodily form" of useful objects. In their first form, they are distinct, as Marx points out. The first form of objects establishes the features which make them particularly useful. Their second form compasses monetary or financial value. It is shared by all objects which have been commodified. In presenting the financial value form as separate from the first form of objects, Marx suggests a structural discontinuity between the particular material character of a use-bearing object and the immaterial, universal stratum of economic exchange.

In *For A Critique of the Political Economy of the Sign*, which was published in 1981, Baudrillard writes that contemporary economic theory must recognize the eminence of the

[15] Robert C, Tucker., ed., *The Marx-Engels Reader*. (New York: Norton, 1978), 303.
[16] Tucker, ed., *The Marx-Engels Reader,* 12.

function of signification.[17] In Marx's account, the physical or "natural" form is always present. According to Baudrillard, mediation uncouples value from physicality. As such, use value cannot thoroughly account for the impact of mediation on the economy. As a supplement to Marx's use value form, Baudrillard conceptualizes what he calls "sign value." In the following passage, he reflects on the emergence of the sign value form:

> It is a question of decoding the birth of the sign form in the same way that Marx was able to uncover the birth of the commodity form in the *Critique of Political Economy*. In consumption generally, economic exchange value (money) is converted into sign exchange value (prestige, etc.); but this operation is still sustained by the alibi of use value. By contrast, the auction of the work of art has this notable characteristic: that economic exchange value, in the pure form of its general equivalent, money, is exchanged there for a pure sign, the painting. So it is an experimental terrain, simultaneously collective and institutional, for separating out the operation of this sign value.[18]

He writes that visual art exemplifies the function of sign value insofar as that which is purely visual may be understood as "pure sign." That is to say, art is often seen as only worthwhile by virtue of aesthetic, or sensory, properties. The value of these properties, meanwhile, is held to be separate from the traditional utilitarian or instrumental conception of the utility of goods or services.

---

[17] Jean Baudrillard, trans. Charles Levin *For A Critique of the Political Economy of the Sign* (USA: Telos Press, 1981)
[18] Baudrillard, *For A Critique of the Political Economy of the Sign*, 112.

Mediation primarily transmits visual and auditory sensoria. In a conventional view, these sensory properties are disconnected from the physical form which would give them the plausible pretext of use value. Exchange value begins with the extraction of value from tangible, material sources and terminates with their re-consolidation in value-producing objects.[19] If "aesthetics" denotes sensoria, all that is digitally mediated would in this sense be understood as pure aesthetics or sign value. Aesthetic content would thus bear use value in the Marxist sense if they also provide a useful resource. I maintain that the basis on which digitally mediated phenomena might not exclusively be considered as aesthetics, or "pure sign," would be provided by their use as information or knowledge, or what might broadly be called "epistemic material." Data, as abstract and non-physical, meet the criteria for sign value rather than use value. However, as I have stated, they do not have intrinsic aesthetic properties. As such, they are more closely linked with knowledge. Data assemblages become useful through their ability to provide epistemic material. It is for this reason that I characterize the role of data in political economy as epistemic.

Baudrillard claims that the portrayal of money as the common value form may foreclose other necessary inquiries into contemporary political economy. With the advent of the sign form, political economy supersedes the conditions described by Marx. As he writes:

> Political economy is this immense transmutation of all values (labor, knowledge, social relations, culture, nature) into economic exchange value. Everything is abstracted and reabsorbed into a world market and in the preeminent role of money as a general

[19] Tucker, ed., *The Marx-Engels Reader,* 304.

> equivalent… but consumption [must now be] considered as the conversion of economic exchange value into sign exchange value.[20]

In the contemporary economy, he explains, sign exchange value is produced and circulated "in the same movement as the production of material goods and of economic exchange value."[21] If the economic import of data rests on their epistemic use, digital production — the rendering of the epistemic as data or sign — is also economic consumption.

**Romano Alquati, Guy Debord, and the Limits of Marxist Orthodoxy**

Baudrillard's claims in *For A Critique of the Political Economy of the Sign* were prefigured by cultural and economic thinkers Romano Alquati and Guy Debord. Alquati, a sociologist who helped found the school of Italian workerism (*Operaismo*), was among the first scholars interested in the labor conditions of the computer industry. Media theorist Matteo Pasquinelli writes that Alquati initiated his research on computer factories in 1961. He describes Alquati's 1962 article "Organic Composition of Capital at the Olivetti Factory" as "the first analysis of cybernetics ever attempted by autonomist Marxism."[22] In "Organic Composition," Alquati details the means by which the mental activities of computer workers are reified as monetary value. He conceptualizes this set of processes as the "valorization of labor." With this concept, Pasquinelli writes, Alquati intended "to unify the Marxian notion of value and the cybernetic definition of information." [23] He adds that Alquati "was clearly looking for a Marxist definition

[20] Baudrillard, *For A Critique of the Political Economy of the Sign*, 112.
[21] Baudrillard, *For A Critique of the Political Economy of the Sign*, 112.
[22] Matteo Pasquinelli, "Italian *Operaismo* and the Information Machine," 53.
[23] Matteo Pasquinelli, "Italian *Operaismo* and the Information Machine," 53.

of information that could condense both its cognitive and economic dimension and that could go beyond the mere mathematical and physical measurements of information theory."[24] It appears that, as early as 1962, Alquati suspected that scholars must view data as separate from the contexts in which they become meaningful in order to more precisely grasp the relationship between digitality as a condition and the social and political effects of data.

In theorizing the digital commodification of cognition as a specific mode of economic production, Alquati implies that the computer industry necessitates a revisitation of Marx. Guy Debord likewise posits a foundational relationship between media and political economy, albeit from the perspective of cultural production rather than labor conditions. In his 1967 book *La Société du Spectacle* (*The Society of the Spectacle*), Debord illustrates a link between the financial value of cultural representation and the Marxist commodity form.[25] As he writes, "the commodity form reduces everything to quantitative equivalence. The quantitative is what it develops, and it can develop only within the quantitative."[26]

Alquati and Debord both recognized the effects of mediation on economic production. But they did not break with Marxist tradition so completely as Baudrillard, for whom the eminence of the sign prescribes a complete turn from Marxist precepts.[27] In Baudrillard's account, media technologies accommodate capitalism so well that they cannot in any meaningful sense be used as tools against it.[28] I adopt Baudrillard's position in maintaining that digital mediation must always be understood as a vehicle for capitalist political economy.

---

[24] Matteo Pasquinelli, "Italian *Operaismo* and the Information Machine," 53.
[25] Guy Debord, *La Société du Spectacle*, trans. Donald Nicholson Smith. (New York, NY: Zone Books, 1967)
[26] Debord, *La Société du Spectacle*, 11.
[27] This is not to imply that Baudrillard read or otherwise engaged with Alquati's work.
[28] Baudrillard, *For A Critique of The Political Economy of the Sign,* 166-167.

This position remains beyond the mainstream of social research on digital phenomena, where the domains of society, politics, and technology are often regarded as categorically separate.[29] Many contemporary thinkers and activists view information technologies as potential accomplices in anti-capitalist political change. A minority, however, emphasize the inextricability of data and capital following the growth of media technologies in the late twentieth century. This group includes philosopher Eugene Thacker, whose 2005 book *The Global Genome: Biotechnology, Politics and Culture* explores the sign value form in digital media through case studies from the biotechnology sector.[30]

**Data Surfaces and Network Properties: The Case of Biotechnology**

*The Global Genome* articulates the coalescence of economic relations and industrial production practices in the common substrate of digital data. As Thacker writes,

> The aim of biological exchange is not to render everything digital and immaterial, despite the industry hype over fields such as bioinformatics and genomics. Rather, the aim of biological exchange is to enable a more labile, fluid mobility across media—to the extent that it is literally immaterial whether the DNA is in a database or in a test tube. This point cannot be stressed enough. The aim of biological exchange—and by extension the aim of the current intersection between biology and computers in genetics and biotechnology—

[29] As Christian Fuchs writes in, "a study of 27,340 Internet Studies articles published between 2000 and 2009 and indexed in the Social Sciences and the Arts & Humanities Citation Indexes found that only 31% cited theoretical works. There is a tendency in Internet Studies to engage with theory only on the micro- and middle-range levels that theorize single online phenomena but neglect the larger picture of society as a totality."

[30] Eugene Thacker, *The Global Genome: Biotechnology, Politics, and Culture*. (Cambridge, MA: MIT Press, 2005)

> is to define biology as information while at the same time asserting the materiality of biology.[31]

Thacker does not believe that biological matter bear greater sign value than any other entity. One factor determined his decision to focus on biotechnology rather than any other industrial sector: the cultural presupposition that "natural" or biological life is distinctly and inexorably material, and that materiality imparts a certain measure of empirical truth or reality. The biotechnology industry, he claims, exploits the widespread belief that the "natural" (or biological) is the "real" (or material) in order to falsify a difference between, for example, biology and artificial intelligence. As Thacker explains,

> Biology can never totally relinquish its reliance on the concepts of biological matter, for, were it to do so, it would be indistinguishable from computer science fields such as a-life or artificial intelligence. Even when biological theories want to make claim to a transcendent quality (as in theories of vitalism or animism), there is still a minimal acceptance of the "essential" material condition of biology. Indeed, our very cultural associations with biology evoke its material, even visceral basis: dissections, lab rats, microbes, microscopes, digestion, disease, reproduction, and decay. Thus, biological exchange is not simply the "digitization" of biology, for biology has arguably always been enamored of the "stuff" of biological life.[32]

[31] Thacker, *The Global Genome*, 9.
[32] Thacker, *The Global Genome*, 9.

When material phenomena are translated into digital data, they are not said to have entirely lost their physical characteristics. For example, the height and weight of analog bodies may be recorded as digital quantia. These features count among what Thacker calls "network properties," or phenomena which, as positivities or "givens," may be expressed as data.

Network properties are the features which digital data are made to resemble, and in so doing, turn into financial value. As Thacker continues,

> What we are witnessing in biological exchange is an emphasis on the network properties of biology through this formulation of biology equaling information. If biology is considered to be an abstract pattern or form—not just a formation but an in-formation — then the material substrates through which this information is distributed are of secondary concern, and that which is seen to be at the core of biology (pattern, information, sequence) can be seen to exist apart from the material substrate (cell, test tube, computer).[33]

Importantly, network properties may be modeled by various forms of digital media or information. To use an example which pertains to psychedelic drug research, information gained from an fMRI brain scan may be rendered as numbers on a tabulated spreadsheet. Digital knowledge is capable of moving across contexts, such as liquid substrates or digital applications, while retaining their meaning or instrumental purpose.

Biotechnology places such profound faith in substrate-agnosticism that, practically speaking, it denies the existence of undigitizable features of biological life — in other words,

[33] Thacker, *The Global Genome*, 9.

those which cannot become network properties. Informatic topographies of bodies modeled in the dry computer laboratories of genomic science, appearing as the silhouette of a cadaver, or perhaps the double helix of a DNA strand, may appear to be perfectly homologous with their non-digital referent. Thacker claims that the target of the biotechnology industry is not this verisimilar re-presentation, but rather a direct presentation or replication.

**Iridescent and Hermeneutic Mediation**

The possibility of direct digital replication presupposes that being and meaning are both fully manifest and immanent with one another. Alexander Galloway writes that the philosophical belief of being as manifest and immanent accommodates a particular theory of mediation. In his book *Excommunication: Three Inquiries in Media and Mediation,* co-authored with Thacker and cultural theorist McKenzie Wark, Galloway notes that this theory has a history and a name: it is the "iridescent tradition." By the terms of the iridescent tradition, he writes,

> meaning is indeed native to representation. Presence itself means something regardless of interpretation. Being in the world is an undivided act within which the self and the lifeworld are produced hand in hand. Thus insight is the natural state of the iridescent mode, for the world always already reveals itself. In this way, blindness and opacity are Hermes's keywords, while illumination and insight belong to Iris. The shining of Iris becomes, in Hermes, the loss of the self into shadow.[34]

[34] Alexander R. Galloway, *Excommunication*, 54-55.

If meaning is indeed native to representation, it would be expanded rather than depleted by an economic exchange model based on the sign value form. However, if being is not an absolute positivity — if it includes elements which cannot be corroboratd by external observation — mediation denotes a decidedly different process. Galloway describes this process as the hermeneutic theory of mediation. He claims that the concept of hermeneutic mediation directly opposes the concept of iridescent mediation. The hermeneutic theory of mediation asserts that meaning proceeds exclusively from interpretation. In this view, meaning and its positivistic proclamation are always non-immanent. The expressive functions of digitization would always construct meaning rather than present it. By the terms of the hermeneutic tradition, digitization as a means of surfacing or manifesting epistemic content leads to an overall epistemic skew towards itself — that is, to the positivistic qualities of knowledge or network properties which data resemble.

In his 2009 book *For A New Critique of Political Economy,* political theorist Bernard Stiegler claims that digital work practices lead to an epistemic skew which refigures "the life of the mind" in the image of digital data. Specifically, he examines a phenomenon he calls proletarianization, which results from "the expropriation of human time submitted to commodity-time."[35] Proletarianization, Stiegler writes, is borne by "digital and reticulated" devices. He argues that these devices subjugate the mind. He warns, however, that it is only possible to understand the relationship between mental proletarianization and digital labor "by way of Freud and the uses which marketing made of his theory of the unconscious",[36] as the mind is exploited at an unconscious or pre-reflexive level. This unconscious exploitation results

[35] Bernard Stiegler, *For A New Critique of Political Economy*, 27.
[36] Stiegler, *For A New Critique of Political Economy*, 28.

from the diffusion of what he labels "hypomnesic" technologies which impact unconscious memory-making functions. As Stiegler explains,[37]

> The spread of industrial hypomnesic apparatuses causes our memories to pass into machines, in such a way that, for example, we no longer know the telephone numbers of those close to us — while the spread of spell checkers causes fear of the end of *orthographic consciousness* and of the literary hypomnesic knowledge that goes with it, and *with that*, the anamnesic knowledge of language.[38]

I would add that the data both cause and effect mental proletarianization, and that the concept of mental proletarianization is the same as the data image of thought.

Stiegler writes that the use of "digital and reticulated" applications always culminates in knowledge. Some of these knowledge bodies comprise cognitive and affective phenomena which do not fit conventional definitions of "knowledge" or epistemic material. Stiegler emphasizes, however, that digital processes always instrumentalize these phenomena as knowledge. As he writes, digital labor "amounts to the everyday and perceptible aspect of what I would like to present here as a vast process of *cognitive and affective* proletarianization," which in turn catalyzes "a vast process of the loss of knowledges: *savoir-faire, savoir-vivre,* theoretical knowledge [*savoir théoriser*], in the absence of which all savor is lost."[39]

*Savoir-faire* refers not to knowledge in any "high" or institutionalized sense. It may be likened to "know-how," and is similar to the terms "finesse" or "savvy." *Savoir-vivre*,

[37] I translate the term "hypomnesic" as "documentary" or "memory-recording."
[38] Stiegler, *For A New Critique of Political Economy*, 28.
[39] Stiegler, *For A New Critique of Political Economy*, 34.

"knowledge of how to live," is also so quintessentially evocative that it may not be considered as epistemic in any normal sense of the concept of "knowledge." Nevertheless, both *savoir-faire* and *savoir-vivre* disintegrate in the course of an operation that is, principly, epistemic. Thus the data episteme expands "knowledge" beyond the scope of cognition and mentality and into the realm of experience and being.

In *Excommunication*, Galloway writes that hermeneutic mediation takes place "in the domain of naming and discourse."[40] By contrast, iridescent mediation reigns over "presence, experience, or feeling."[41] This statement misleadlingly partitions the realms of cognition and mentality from those of experience and being. Stiegler's work implies that the realms of sense, presence, experience and feeling are equally prone to digital commodification. If sense and presence are permissible as knowledge, their capture in digital applications will also contribute to proletarianization. It is not necessary, then, to distinguish between the acts and experience, sensing, and thinking. Whereas the former two may appear to fall into the ambit of immateriality, and the latter, materiality, all are exploited as knowledge by the data episteme.

**Digital Normativity**

Like Galloway, political theorists Arthur Kroker and Michael A. Weinstein reinforce the theoretical presupposition divide between the humanistic "material" and the digital "immaterial." In their 1994 book *Data Trash: The Theory of Virtual Class*, they discuss the speculative future technologies of sensually immersive digital environments. They predict that such applications will dominate the future of human social life, and warn that a taste for the immaterial and virtual

[40] Galloway, *Excommunication*, 55.
[41] Galloway, *Excommunication*, 55.

might soon supplant a desire for a sensory or humanistic "real." "Something better than the flesh has seduced and intimidated [humanism]," they write. This would be "the technological imaginary," or "virtual reality," which, as they claim, "materializes through and in technology, its most privileged form being the hyper-real."[42] And that note that this idea is gaining currency in society:

> Heard at an academic meeting: a good use for virtual reality would be to make sex offenders experience the suffering of their victims. Soon torture will become (virtual) torture-effects. Think of a system of home imprisonment in which the convicts live engrafted in VR suits that place them within perpetually punitive environments. A modern Dante wouldn't write poetry, but would be a corrections engineer.[43]

It is notable that in the above scenario, the digital over the non-digital is idealized by virtue of its unspoken, but also undeniable, inhumanity. Kroker and Weinstein's colleagues want the darkest version of a virtual reality for offenders who might already be considered less-than-human on account of their decided moral indiscretions. In some sense, these criminals already exist beyond the scope of humanistic regard which orients Kroker and Weinstein's analysis. Thus this hypothetical may have limited analytic purchase.

The emergence of robots designed for human sexual gratification might provide a more fruitful example insofar as those implicated are not necessarily seen as unethical, or at least beyond normal moral consideration. It may be that the moral panic which surrounds sex robots stems from an inchoate perception that some quality of sensory knowledge — which would be a

[42] Arthur Kroker and Michael A. Weinstein, *Data Trash: The theory of the virtual class.* (Montreal: New World Perspectives, 1994), 45.
[43] Kroker and Weinstein, *Data Trash*, 45

very personal variation of *savoir faire* — might be at stake. The use of robots for sexual activity might then be considered as an instance of political subordination.

Communications scholar Sun-Ha Hong writes that data facilitate the expansion of governance into these deeply intimate interior realms. He introduces the concept of "data's intimacy" to describe this capacity as an emerging category of political power. "Data's intimacy," refers to the possible that datagenic tools will "come to know us better than we know ourselves."[44] Data recorded by sex robots may be "intimate" insofar as the knowledge they represent could fall beyond the limits of users' own self-knowledge or self-awareness. However, the data recorded by more ubiquitous devices, such as smartphones, would perhaps be the most intimate of all, as their pervasiveness gives them a significantly wide range of access to the personal lives of their users.

Hong writes that smartphones and other commonplace technologies lead to a scenario in which information produced by devices is misattributed to the self. "As [data] networks reconfigure the production and circulation of 'personal' data," he writes, "they also redistribute the actors and authority involved in the production of 'self'-knowledge." Hence the questionL "who (and what) produces data about the individual? How is it consecrated as truth, as knowledge?" [45] Knowledge made by data-processing functions may very well be misperceived as the provenance of one's non-digital self. In effect, one might misconstrue oneself as the exclusive author of this knowledge, and would hold oneself solely accountable for its implications.

[44] Sun-Ha Hong, "Data's Intimacy: Machinic Sensibility and the Quantified Self," *communication +1*: Vol. 5, Article 3 (Fall 2016), 1.
[45] Hong, "Data's Intimacy," 2.

In his 2017 book *We Are Data: Algorithms and The Making Of Our Digital Selves*, Internet studies scholar John Cheney-Lippold is similarly interested in the misplaced attribution of computational knowledge to the self. He examines the video game console Wii Sports, whose games require players to perform physical activities. Since it is often used as a form of exercise, Wii Sports players volunteer their personal information for a return of health statistics generated from Wii Sports' database, including indicators for weight, gender and age. Cheney-Lippold notes that the many variable factors which yield these statistical data are unknown to the individuals from whom the data is culled and to whom individual indicators pertain. For all that users are aware, Nintendo may obtain information from its entire Wii Sports user base, or any other bank of data, and apply proprietary, inaccessible algorithms to infer the statistical norm against which individual health is measured. According to Cheney-Lippold, the meaning of these signs starts to shift accordingly. He describes what it means to be "eighty years old" within the context of Nintendo Wii Sports:

> In this case, being "80" may not mean you've successfully rotated around the sun 80 times, but it does lodge you within an unknown relation to discourse. While a medical test might alert an actual old person to high cholesterol, there is no scientific evidence that indicates one is more or less likely to suffer a heart attack at "80." Instead, Wii Sports measurable type of "age" floats around, ontologically and epistemologically separated from age. But "age" still "conducts" through discursive definition. It still allocates attention to our health. It establishes what it means to be "young" versus "old." It reifies youth as good and seniority as bad. In short, measurable types determine what different discourses come to mean in their datafied form: from what is "age" to who has

> "health" and even to what is "good." But what if these categories are unknown? What if, unlike the panopticon, there is no identifiable entity that we perceive to be watching/evaluating/disciplining us?[46]

Here, "measurable types" appear relative only to themselves, as in floating rates of financial currency exchange. The entity against which they are measured, and from which they thus take their meaning, may appear to be invisible or nonexistent. As stated, digital data have no essential empirical features.

The absence of empirical features equips data with greater ability to influence human lives. If they are imperceptible, the effects of data cannot appear as an assault from the outside, and may instead be experienced as endogenous phenomena. The control variables thus cleverly trade perceptibility for increased normative power. Chey-Lippold argues that the resulting effect may destabilize ontological facts once taken for granted, as in the meaning of being eighty years old:

> If "80" and its accompanying conception of health attaches to your profile without your consent, how might your world be different? What would that world look like if the category of "80" — indexical to nothing more than an algorithmic assessment of baseball, tennis, and dodging data — changes? What if "80" is now based on how well you score in golf, boxing and bowling? And what if Nintendo updates its algorithms, modifying how it values golf given users' higher-than-average scores on golf versus other

[46] John Cheney-Lippold, *We Are Data: Algorithms and the Making of Our Digital Selves*. (New York, NY: NYU Press, 2017), 98.

> scores? “80” still means something, but what it means transmutes without announcement.[47]

It is likely that Cheney-Lippold did not select “golf” at random from the athletics on offer through Wii Sports, but because it is stereotypically connected with older age. A reality bounded by the statistical averages of one measurable type — which are often expressed as stereotypes — becomes the only possibility to which those of such a type can aspire. When Nintendo alters its algorithms to reflect the fact that older users tend to excel at golf over other sports, they reinforce a norm, or systematically foreclose the existence of statistical outliers. Their campaign of proletarianization sparks the gradual loss of any non-normative conception of oneself.

In her essay “The Digital Regime of Truth: From the Algorithmic Governmentality to a New Rule of Law,*”* philosopher Antoinette Rouvroy addresses the relationship between digitality, statistical normalization, and the predictive functionalities of algorithmic methods. She invokes sociologist Luc Boltanski’s conceptualization of “worlds” as spaces of unpredictability indeterminacy. Within the space of a “world,” Boltanski claims, the improbable does not denote the impossible. As Rouvroy elaborates,

> The world is where things occur, it is what is foreseeable while adding the radical and irreducible element of unpredictability. All these events that can occur and that we cannot predict, it is the excess of the possible on the probable, that is everything that escapes it,

[47] Cheney-Lippold, *We Are Data*, 99

> for instance the actuarial reality with which we try precisely to make the world more manageable in reducing it to what is predictable.[48]

Rouvroy is concerned with what she calls "algorithmic governance," a condition wherein algorithms retract any measure of indeterminacy from social life. Algorithmic governance retracts any "excess of the possible on the probable," or any phenomena which do not fall beneath a statistical normal curve. It depletes the complexity of ecological systems and functionally undermines "worlds," at least as the "world" is defined by Boltanski. The procedures described by Thacker, Kroker and Weinstein, and Cheney-Lippold could be considered as cases of algorithmic governance.

Thacker's exploration of the Human Genome Project (or HGP) in *The Global Genome* exemplifies the tangible effects of algorithmic governance. The HGP's attempt to exhaustively document human genetics, he writes, has a negative impact on human diversity. In Thacker's words,

> The problem of genetic difference has been an issue with the HGP since its inception. As is known, genomics aims to derive a single genetic map by way of a statistical averaging. Such tactics determine which "letter" or which gene will be entered into the database at a given locus. Given the claims by genetics researchers that each individual differs from others by approximately 0.1 percent of its DNA, such an averaging seems to be a sensible, practical way of working. However, given that there are at least some 30,000 genes and more than 3 billion base pairs ("letters") in the human genome, and that a

[48] Antoinette Rouvroy, trans. Anaïs Nony and Benoît Dillet. "The Digital Regime of Truth: From the Algorithmic Governmentality to a New Rule of Law." La Deleuziana, Online Journal of Philosophy, no. 3 (2016): 8.

> number of known genetic disorders (such as Parkinson's or sickle cell anemia) are in part triggered by a single base-pair mutation, such homogenizing practices take on a different tone.[49]

Thacker examines the case of single base-pair mutation as an example of a difference in data that would seem so small as to be scientifically insignificant. As he notes, this apparently negotiable variation can, in fact, yield significant phenomena in physical bodies. Single base-pair mutations can lead to the development of Parkinson's disease or sickle cell anemia.

What is problematic is not the notion of a human genetic cartography per se, but that the HGP seeks a map that is both complete and applicable to all human bodies. It is, as Thacker indicates, impossible to digitally map the entirety of the human genome, because biological material is made of continuous information. Because it is both infinitely large and infinitesimally small, the desired map could never perfectly represent all possible variations. Of equal concern is the fact that the Human Genome Project's archives historically include more robust data banks from certain geographic territories. As Thacker writes, initiatives within the HGP could never be as successful as its advocates may hope. Here, he describes an HGP sub-initiative called the "Human Genome Diversity Project," or HGDP:

> The HGDP's contribution to the human genome–mapping project would be to consider the ethnically based genetic differences from a range of "other" cultures, especially those cultures without dense histories of transethnic genetic migration. Its job would basically be to account for the excess genetic material not within the Eurocentric field of

[49] Thacker, *The Global Genome*, 115.

> consideration of the human genome projects (that is, the genome projects aim above all for universality, but the HGDP would instead concentrate on the local). It has been only recently, though, that the methods and practices of the HGDP have come under fire, primarily owing to its ties with debates surrounding the patenting of genes and cell lines from indigenous cultures. Certain HGDP practices thus not only constitute literal examples of genetic colonialism… but they also bring up questions about the ways in which excess is translated into a dominant system involving science, politics, and juridical-economic structures.[50]

The HGDP attempted to rectify this apparent injustice by retroactively including data from "diverse" or "other" populations well after the Human Genome Project's initiation. As Thacker points out, this initiative raises numerous questions. For example, if certain data were first considered unnecessary and only brought in after certain self-reflexive critical revisions, what method should scientists take in gathering and working with this new data? Should they be handled any differently than the original? If statistical algorithms had already been derived from the original data, must they be discarded? It would seem that this retroactive inclusion is only a partial solution to the problem.

The HGDP, as presented by Thacker, appears to posit two different categories of excess. The first includes DNA variations which are seen as so miniscule as to be irrelevant (although they may in fact cause Parkinson's disease or sickle cell anemia). The other is constituted by genetic data from non-Eurocentric populations. In practice, there is almost certainly overlap between these two. For example, certain genetic disorders resulting from single base-pair

[50] Thacker, *The Global Genome*, 116.

mutations may be more common within specific geographically bounded populations. To illustrate their categorical differences, however, I will depict two outcomes which follow from the predetermined statistical averaging in each case respectively. The first category of excess would make it so that the work of the Human Genome Project cannot be used to advance knowledge on conditions that result from decidedly insignificant genetic variations. The second category obstructs inquiry into the effects of Eurocentrism in the HGP database. If there is any possibility that the data provided by the Diversity Initiative would take its meaning based on algorithms or other methods derived from Eurocentric data, the total knowledge provided by this project would be unambiguously biased.

The actual impact of the Human Genome Project and Wii Sports on human life may be difficult if not altogether impossible to determine. While it may be that the "feeling" of one's age has been influenced by the outcome of homogenized data pools which draw from millions of other people, it is not possible to ascertain this with falsifiable certainty. If there is any indignation associated with this, its source would have no single or proper name.

**Predictive Systems and Resemblance Chambers**

In contrast to the above, content recommendation algorithms reveal the cultural and moral boundaries of the future the delimit. In his article "Data, Culture, and the Ambivalence of Algorithms," William Uricchio examines recommendation algorithms developed and owned by major digital entertainment firms, including Netflix and Hulu.[51] The softwares and interfaces

[51] William Uricchio, "Data, Culture, and the Ambivalence of Algorithms," in *The Datafied Society: Studying Culture Through Data*, ed. Mirko Tobias Schäfer and Karin Van Es (Amsterdam, Netherlands: Amsterdam University Press, 2017)

produced by these companies intentionally restrict and direct the interactions their end-users have with their wares. As Uricchio explains,

> One of the often referenced developments in this space was the 2009 Netflix Prize, a $1,000,000 bounty for creating the greatest improvements to Netflix's own collaborative filtering algorithm for predictive user ratings of films (the winner, Bellkor, achieved a 10.09% improvement on predictions). In these predictive systems, the past is prologue, as the data generated through our earlier interactions shape the textual world selected for us. No "surprises" or "unwanted" encounters, just uncannily familiar themes and variations. This logic extends into the informational domain as well, where it has been the subject of sharper critique, mostly focused on the argument that such predictive systems create an echo chamber in which our existing views of the world are reinforced by rarely challenged.[52]

The concept of the "echo chamber" has also frequently been referred to as the "filter bubble." It entails a hermetic enclosure which surrounds individuals as they live, work and play in networked contexts. Its features are derived from the previous activities of those who lived, worked, and played within it. Thus the walls of the chamber begin to appear as mirrors, although their reflections are often strange and flawed. A number of digital content providers appear to operate under the assumption that customers prefer to expend the least amount of time in selecting their product. A major variable in the design of their content-recommendation

[52] Uricchio, "Data, Culture, and the Ambivalence of Algorithms," 131.

algorithms draws on the likelihood that future desires will bear similarities to earlier selections. Content recommendations thus tend to resemble prior activities.

For firms whose primary service is entertainment, this may seem like a benign business strategy. The consequences wrought by the goods of Netflix and Hulu do not seem as dramatic as the potential outcome of the Human Genome Project. However, as Uricchio points out, they seem to lean towards the reinforcement of known preferences at the expense of new information. An extreme variation on this phenomenon would see each subject trapped within their own solipsistic circuit. While sealed around the individual subject, the media that constitute this enclosure would not draw primarily from the individual's activity. They would instead present an amalgamated average culled from others within the subject's computationally predetermined demographic milieu.

Recommendation algorithms exploit data from mass banks that are then addressed to the one. So while the circuit may appear to be self-sealed, it would continue to receive inputs from other sources. This is again a situation of misplaced attribution of epistemic authority, where individuals are unable to distinguish the elements of networked digital media which derive from their unique activities from those which have not, and the difference between their individual selfhood and the generic or universal breaks down.

Digitization processes remake all phenomena in accordance with the generic and finite structure of data. However, the transition from analog to digital rarely reveals itself, as data can almost perfectly assume the likeness of the properties which they are designed to replicate. They cannot, however, take on the appearance of negative entities, or those which cannot be witnessed or legitimated by positivistic measures. In the following chapter, I explore the role of negativity in mentality. I assert that thought is predicated on negation, and as such, the data episteme —

which only promotes positive knowledge — misconstructs the human mind. Psychedelic science, by contrast, affirms and departs from the principle of negation in mentality. It is thus incommensurate with an epistemology of similitude.

## Chapter 3: Digital Psychopolitics and Psychedelic Chaoids

*To abstract is to construct a plane upon which otherwise different and unrelated matters may be brought into many possible relations. To abstract is to express the virtuality of nature, to make known some instance of its possibilities, to actualize a relation out of infinite relationality, to manifest the manifold.*

McKenzie Wark, *A Hacker Manifesto*[1]

### Introduction: Marx Comes to California

In his 2011 book *Cognitive Capitalism*, economist Yann Moulier Boutang argues that the economy is increasingly dependent on cognitive labor. With the rise of digital commodities, he writes, cognition becomes the most valuable financial asset. *Cognitive Capitalism* opens with a brief historical account of the emergence of the digital technology sector. By the late twentieth century, firm owners in California's Silicon Valley region had perfected the art of extracting value from digital goods and services. By 1985 financial investment in "intangibles" — Moulier Boutang's term for digital objects — already exceeded the amount invested in physical materials.[2] He adds that the very concept of financial value appears to have been ineluctably altered by the digital turn, and suggests that a new economic theory must follow suit.

Moulier Boutang's "cognitive capitalism" does not emphasize the eminence of the sign, as in Jean Baudrillard's sign value form. He instead claims that economic theorists are mistaken in their failure to interrogate or depart from the principle of tangible use value. Such ventures, he asserts, are vital for the thinking of alternatives to capitalism. As he writes,

[1] McKenzie Wark, *A Hacker Manifesto (*Cambridge, MA: Harvard University Press, 2004), 213.
[2] Yann Moulier Boutang, *Cognitive Capitalism* (Cambridge: UK, Polity Press), 50.

> By saying "Marx in California" we are simply trying to explain the internal revolution that historic capitalism is enacting right before our eyes. Socialism is not simply late in arriving at a war that has been lost. It is late in arriving at capitalism and at a political economy, and this explains the surface sickness that strikes the famous "critique of political economy" — a discipline that is ritualistic more than real. Moving towards a change in political economy, a change that addresses the new great transformation, is no small matter.[3]

*Cognitive Capitalism* appears designed for readers unconvinced that such a massive transformation is indeed at hand. Moulier Boutang imagines an audience familiar with Marxist thought when he asserts that immaterial digital production is not "an illegitimate rent at the expense of 'real production,'" but rather "sits at the heart of economic value."[4] The theory of cognitive capitalism views the relationship between mentality and digital production as key. It points up economic development as a function of data's contact with the mind.

Moulier Boutang defines cognitive capitalism as a "small defrag program" for the "mental hard drive" at the core of Marxist thought.[5] As his argument unfolds, however, its alleged "smallness" appears increasingly questionable. He describes nothing less than a thoroughly transformed ontology of financial value, with correlate effects on work and social life. Cognitive capitalism relies on "the cooperative labour of human brains joined together in networks by means of computers."[6] It prescribes new forms of employment, including project management and various "outsourced relations of subcontracting, partnerships and locally based

[3] Moulier Boutang, *Cognitive Capitalism,* 7.
[4] Moulier Boutang, *Cognitive Capitalism,* 7.
[5] Moulier Boutang, *Cognitive Capitalism,* 8.
[6] Moulier Boutang, *Cognitive Capitalism,* 57.

relationships."[7] Meanwhile, the demand side of the market is increasingly invested in "technologies of the mind," or those which "set mental faculties into operation through interaction with the new technical objects: audiovisual media, computers, the Internet, game consoles."[8] Increasingly, the desiderata which drive the economy are not discrete material "things," but access to digitally-facilitated social relations.

Under cognitive capitalism, subjectivity and relationality become inexhaustible economic resources, and digital interactivity automatically replenishes financial worth. As the "intangibles" yielded by digital social interactions continue to appreciate in value, "one in particular is promoted to a decisive role in economic growth," Moulier Boutang explains. This is "the process of capturing… the innovation present in the interactive cognitive processes of social cooperation and of tacit knowledge."[9] Moulier Boutang's exploration thus moves into the arena of knowledge production. As he puts it, "knowledge and science,which had been incorporated in the valorisation of industrial capital but had remained distinct, become a strategic location, the 'leading sector' of the system."[10] Under cognitive capitalism, the externalized intermediaries which at one point linked subjectivity and financial value, as in Romano Alquati's valorization of labor model introduced in chapter two, become superfluous. Value is instead poached directly from cognition. The mental operations which produce novel ideas are fused with the means of production, and the subject's unique connection to their own capacity for innovation breaks.

Moulier Boutang writes that the potential for innovation is in essence the same phenomenon as Marx's "living labor," which conceptualizes the potential for workers to

[7] Moulier Boutang, *Cognitive Capitalism,* 57.
[8] Moulier Boutang, *Cognitive Capitalism,* 56-57.
[9] Moulier Boutang, *Cognitive Capitalism*, 50.
[10] Moulier Boutang, *Cognitive Capitalism*, 50.

generate value. There is, however, a major difference between living labor as conceived by Moulier Boutang and Marx respectively. The potential for mental activity gives itself far more readily to digital means of production than does any other form of labor-potential. Although he takes care to point out that cognition does not rely on "muscle-power consumed by machines driven by 'fossil-fuel' energy,'" Moulier Boutang does not consider that there exists a connection between digital value and the property of data which permits the digital economy to inhabit and establish the space of cognition.[11] This property, as it were, is data's ability to usurp mentality by assuming any positive form.

Moulier Boutang's insufficient engagement with the ontology and operability of the digital sign restricts his analysis in *Cognitive Capitalism*. Meanwhile, his commitment to traditional economic categories, such as the notion of the "externality," prevents him from offering a more precise theory of contemporary economic proliferation. In the following passage, he uses the category of "externality" to classify the major products of cognitive capitalism:

> In cognitive capitalism, external effects — what we have defined as externalities — cease to be marginal and tied to simple partial phenomena of indivisibility of public goods. If the core of the value to-be extracted is based on intelligent, inventive and innovative labour, and if the latter mobilises the cooperation of brains in networks, then capturing positive externalities becomes the number one problem of value.[12]

[11] Moulier Boutang, *Cognitive Capitalism*, 37.
[12] Moulier Boutang, *Cognitive Capitalism*, 51.

Here, Moulier Boutang implies that positive externalities remain something other than the intended outcomes of exchange. However, the means by which "external effects" become financially valuable are no longer meaningfully different than any other method of commodification. After the rise of digital media, all manifest and positive phenomena are subject to capitalist expropriation in precisely the same way. By 1981, Baudrillard had already observed the scant time remaining for the conceptual coherence of an economic "outside."[13] It is possible that Moulier Boutang only holds fast to the concept of "externality" in order to avoid straying too far from traditional economic thought.

*Cognitive Capitalism* also gives undeserved attention to an archaic vision of the relationship between time and labor. Moulier Boutang writes that economists must now contend with "work done outside working hours."[14] This is helpful as a point of departure: digital technologies have clearly facilitated the expansion of labor beyond distinct increments of time. However, Moulier Boutang only allusively projects a reality in which the majority of workers continue to labor beyond the physical location of employment or their recorded working hours. "What a company is worth is now determined outside its walls," he writes.[15] However, it would be more productive to observe that many firms now have no brick and mortar walls, and that digital networks catalyze the production of financial value performed beyond the capacity of paid employment, for example by selling data generated by networked digital services.

[13] As Jean Baudrillard writes in *For A Critique of The Political Economy of the Sign*: "The analysis of the production of signs and of culture thus does not impose itself as exterior, ulterior, and 'superstructural' in relation to that of material production; it imposes itself as a revolution of political economy itself, generalized by the theoretical and practical irruption of the political economy of the sign." (Jean Baudrillard, *For A Critique of The Political Economy of the Sign*, 112-114).

[14] Moulier Boutang, *Cognitive Capitalism*, 55.

[15] Moulier Boutang, *Cognitive Capitalism*, 55.

Moulier Boutang's commitment to outmoded economic norms prevents him from recognizing the absolute interfusion of data, mentality, and economy. Nevertheless, *Cognitive Capitalism* is useful for its depiction of contemporary capitalism as a mental effect. Other thinkers have taken a similar tack. In a review of *Cognitive Capitalism*, McKenzie Wark indicates a handful of points where Moulier Boutang implies a more radical systematic critique. In many instances, Wark agrees with Moulier Boutang: both scholars, for example, maintain that "knowledge-work is the way information is made."[16] However, Wark observes that Moulier Boutang's distinction between work and non-work is a misguided maneuver to preserve knowledge as a space of social and economic exception. Instead, she argues, cognitive capitalism subsumes both "knowledge" and "information" to the same end.[17] When labor is performed prior to reflection and intentionality, there can be no exceptional or unequivocal dynamic of thought.

Wark also critiques Moulier Boutang's empirical overview of digital economic production. Although he dispenses with the need for intermediary devices, Moulier Boutang still invokes Alquati's valorization as an applicable model. In his reliance on the concept of valorizing labor, Moulier Boutang implies that subjectivity still exists in a position relative to the computing machine, and as such, might still be thought as distinct from it. Wark, by contrast, imagines that a sort of constant and frozen mentality administers all cognitive activity, an entity she names "dead cognition." "Just as dead labor congealed into fixed capital overtook living labor," she writes, "so too the dead cognition reified into information systems might not have taken over from the living labor of knowledge workers."[18] Dead cognition, she adds, has

[16] McKenzie Wark, *General Intellects: Twenty-One Thinkers for the Twenty-First Century.* (London, UK: Verso Books, 2014), 69.
[17] Wark, *General Intellects*, 69.
[18] Wark, *General Intellects*, 69.

supplanted the potential for innovation, and "might be what the era of 'big data' is really about."[19]

Although digital systems may reify cognition, the phrase "dead cognition" is misleading. Digital capitalism does not "kill" the potential for mental innovation so much as it repurposes this potential as mediator. While the living labor of cognition "dies" in the sense that its servitude is infinite, it remains alive insofar as it labors nevertheless. Moreover, unlike dead labor, what Wark calls "dead cognition" is not immobile. It is that the potential for living labor has attained to the plane of immanence, as explained in chapter two. It moves as part of the plane, not relative to it. Here, information is no longer valorized in a space or flow which originates in the pre-political consciousness. If the opposite were true, digitization would only confer economic worth once cognition-in-motion turns into data. Cognition is instead already valuable in the mental domain. The data image of thought persists even when the worker — the technology user — does not interact with digital applications.

[19] Wark, *General Intellects*, 69.

**The Psy- Turn in Critical Theory**

In his 2017 book *For A New Critique of Political Economy*, political theorist Bernard Stiegler draws richly from Moulier Boutang to describe the psychological effects of the new economy. Philosopher Byung Chul Han's *Psychopolitics: Neoliberalism and New Technologies of Power*, which draws from Stiegler's work, depicts digital capitalism as giving rise to new norms of feeling and experience. Han's vision of life after Big Data is fatalistic and uncompromising:

> The subject of today's world is an entrepreneur of the self practicing self-exploitation — and, by the same token, self-surveillance. The auto-exploiting subject carries around its own labor camp; here, it is perpetrator and victim at one and the same time. As a self-illuminating, self-surveilling subject, it bears its own, internal panopticon within; here, there is no difference between guard and inmate. The digitalized, networked subject is a *panopticon of itself.* This ensures that each and every person has now taken on the task of conducting perpetual auto-surveillance… our digital habitus provides an extremely precise likeness of ourselves — of our very souls.[20]

As Han writes, Big Data constructs the soul as positivity. To be sure, this "soul" has no theological or transcendent dimension. The word "soul" signifies the site or target of psychopolitical governance which does not yield to expression. Insofar as all cogible forms are datafiable, "soul" evoked this indefinite element. It is a *sine qua non* that is as yet capable of "seduction" and "destruction" by digital control techniques.[21]

[20] Han, *Psychopolitics: Neoliberalism and New Technologies of Power* (London: Verso, 2017), 61.
[21] Han, *Psychopolitics*

Han's "soul" is the same object under scrutiny by sociologist Franco 'Bifo' Berardi in his book *The Soul At Work: From Alienation to Autonomy.*[22] As in *Cognitive Capitalism* and *Psychopolitics, The Soul At Work* examines subjectivity under digital capitalism. Berardi's account of the "soul" reveals a commonality between his project and the aims of Han and Moulier Boutang: namely, an oblique and apprehensive relationship with the psy- disciplines. Han and Berardi write at great length about depression, indicating that the disorder has a distinctly capitalist etiology. And although Moulier Boutang is not concerned with depression specifically, he still observes the consequences of cognitive capitalism on mental health. As he asks, "how shall we separate the involvement of the attention-power of brains, in other words the neuronal activity of memory, emotions and body?"[23] While he proposes a guaranteed income to alleviate the economic instability associated with cognitive capitalism, Moulier Boutang does not resolve the long-term psychological complications that might result from a datafied consciousness.[24] Berardi and Han likewise do not propose treatments for the multiple diagnoses they make.

Moulier Boutang's "cognition" and Berardi and Han's "soul" refer to something quite different from the subject of the empirical psy- sciences. In keeping distance from the empirical investigations of psychology researchers, these thinkers observe a well-established disciplinary divide. Anthropologist Nicolas Langlitz writes that this divide has its roots in the instrumentation of psy- sciences by the Nazi regime. In his article "Is There A Place for Psychedelics In Philosophy?," Langlitz surveys the career of Thomas Metzinger, whom he introduces as

[22] Franco 'Bifo' Berardo, *The Soul At Work: From Alienation to Autonomy. (*Cambridge, MA: Semiotext(e), 2009).
[23] Moulier Boutang, *Cognitive Capitalism,* 118.
[24] Moulier Boutang, *Cognitive Capitalism,* 118.

"Germany's most prominent neurophilosopher."[25] Noting Metzinger's reluctance to adopt "neuro" as a qualifying prefix, Langlitz states that continental theorists are notoriously hostile towards vernacular referencing sciences of the mind or brain. This hostility, Langlitz writes, sedimented over a period of decades following the Holocaust. As he elaborates,

> experimental psychologists had been driven out of German academic philosophy at the beginning of the twentieth century… [and] the opposition to any form of "psychologism" has been deeply rooted on both sides of the Atlantic. By contrast, Metzinger's interest in mind and brain is not a product of the seminar room but grew out of his participation in the counterculture of 1970s Frankfurt, which experimented with numerous consciousness-altering techniques, from meditation to psychedelic drugs. Politically, however, the radical Left to which Metzinger belonged opposed any form of "biologism" because of its association with Nazi ideology.[26]

Critical theory, Langlitz adds, remains suspicious of the psy- disciplines to this day. Nevertheless, the consistent use of psy- vernacular in the works of Han, Berardi, Boutang and their peers speaks to a renewed disciplinary alliance.

Psy- studies have already enabled scholars to more precisely express the cognitive functions exploited by digital political means. Berardi deploys psy- frameworks liberally in his essay "The Mind's We: Morphogenesis and the Chaosmic Spasm Social Recomposition,

[25] Nicolas Langlitz,"Is There A Place For Psychedelics In Philosophy?" *Common Knowledge* 22, no. 3 (2016): 374.
[26] Langlitz, "Is There A Place For Psychedelics In Philosophy?," 375.

Technological Change and Neuroplasticity."[27] "The Mind's We" opens with Berardi's recollections of an academic meeting titled "Psychopathologies of Cognitive Capitalism," which offered "the first opportunity for exchange and cross-fertilization between the European theory of social composition and the Californian cultural landscape."[28] This meant that, for the first time, "European philosophy focused on historical subjectivation met the Californian theoretical context, marked by a special attention to the implication of technology and the ecology of mind."[29] It would appear that research programs of a certain West Coast descent are closing in on the same territory as European critical theory. "When social recomposition meets neuroplasticity," Berardi points out, "the theoretical fields of neurology, ecology of the mind, and cyberculture are approaching those problematics that European thought has considered from the point of view of Ontology or the point of view of History."[30]

The "problematics" to which Berardi refers here are mechanisms of the governance of subjects. He proceeds to discuss the advent of informatic acceleration as the eminent mode of political control. With the accelerating speed of epistemic production, he argues, comes a complete fracture of the norms of "modern politics." He explains the failing state of "modern politics" as follows:

> The conceptual and practical sphere of modern politics has lost its ground. In the age that began with Machiavelli and culminated with Lenin, human will (embodied by the prince, the State, the Party) was able to reign over the chaotic variation of events and projects,

[27] Franco 'Bifo' Berardi, The Mind's We: Morphogenesis and the Chaosmic Spasm Social Recomposition, Technological Change and Neuroplasticity," in *The Psychopathologies of Cognitive Capitalism: Part One*, ed. Arne de Boever and Warren Neidich. (Berlin, Germany: Archive Books, 2013).
[28] Berardi, "The Mind's We," 7.
[29] Berardi, "The Mind's We," 7.
[30] Berardi, "The Mind's We," 8.

> and was able to submit individual interests and passions to the common goals of social order, economic growth and political progress.[31]

It might be added that, although the means to enact one's will have rarely been granted to more than a small stratum of society, the figures Berardi invokes exemplify major principles of political agency. By the traditional view of European political theory, the prince, the State, and the Party are those who speak and act. The enactment of their will has always been able to meaningfully impact the body politic. Berardi argues that digital information technologies preempt such willful activity:

> The infinite proliferation of information flows unleashed by the accelerating network technology has made impossible the conscious elaboration of information by the individual mind, and the conscious coordination of individual agents of will. The loss of effectiveness of political action has to do with time: reason and will, the essential tools for political action, are unable to process in time and decide in time. The technical transformation has changed the conditions of mental activity and the forms of interaction between the individual and the collective sphere… in the past it was possible to describe separately the conscious acts of the individual and the effects that the individual intentionality was able to produce on the collective dimension. Now the distinction between individual and collective has been blurred.[32]

[31] Berardi, "The Mind's We,", 9.
[32] Berardi, "The Mind's We," 9.

Berardi holds discrete computation as culpable for the foreclosure of the "conscious elaboration of information." He writes:

> In the present digital Infosphere, the conscious activity is involved in super-individual connective concatenations. The connective concatenation shapes the Unconscious and the Imagination according to a discreet [sic] —versus continuous— modality of perception. Syntactic rules of semiotic exchange take the place of those semantic rules that were working in the dimension of conjunctive relation and analogical communication.[33]

Discrete computation, he claims, implants its own experiential reality where the analog phenomenological used to exist. As he notes, reason and will are no longer able to process and unfurl in time due to the temporal acceleration of informational currents. Hence the dimension of time cannot stabilize the knowledge which it enfolds, as time is itself in motion. These faculties dissolve in accordance with their establishment as the data image of thought.

**Data's Social Contract**

The data image of thought advances a sort of digital social contract. "The individual," Berardi writes, "has to comply with the rules of interaction of the collective, if he/she wants to produce effects in the collective dimension." Assuming that the "collective dimension" includes access to digitally-facilitated social relations, it would seem that most individuals do, indeed, desire to produce effects in Berardi's "collective dimension." "This is why politics no longer works," Berardi claims. "One cannot interact efficiently in the collective dimension if one has not

[33] Berardi, "The Mind's We," 11.

previously accepted the rules of compliance that shape language, action and interpretation of signs."[34] The digital social contract exemplifies a cruel paradox of political life under digital capitalism. While contractual rules may be necessary for political entities to thrive, the digital social contract remits the possibility of political action.

Berardi writes that the destruction of political actionability over time forecloses the process by which the figure of the "individual" emerges. The theory of individuation, originally posited by philosopher Gilbert Simondon, refers to "the continuous resolution of the never dissolved polarity between system and environment."[35] "Individuation recognizes a divide between systems —including but not limited to the system of individual human subjectivity — and their habitats or contexts. It denotes the continuous attempt to reconcile the two, or a mutually constitutive dialectic relationship. "The process of individuation starts from the pre-existing reality of the collective sphere," Berardi notes, "but the collective sphere has simultaneously to be considered as effect of the interaction between existing individuals."[36]

If there is, as Berardi claims, a perceptual and phenomenological mode particular to discretized consciousness, this would appear to foreclose the process of self-individuation, which is resolutely continuous. His normative conclusion asks society "to find ways to consciously interact with neural evolution," and to "think in terms of meta-connectivity."[37] To qualify what he means by "neural evolution," Berardi turns to philosopher Félix Guattari, whose theory of the "chaoid" links signifying activities with neurological functionality:

[34] Berardi, "The Mind's We," 11.
[35] Berardi, "The Mind's We," 11.
[36] Berardi, "The Mind's We," 10
[37] Berardi, "The Mind's We," 19.

> In Guattari's parlance "chaoid" is a semiotic device that makes possible the disconnection from the pathogenic rhythm and the creation of a new concatenation between consciousness and Infosphere. Chaosmosis is the evolutionary process of recomposition that leads to the emergence of a new concatenation, and therefore to the possibility of a new sympathetic syntony of the molecules composing the social body and the flows circulating in the Infosphere… Guattari suggests that we must create chaoids for disentanglement, for prefiguration and re-syntonization. Chaoids have nothing to do with the sphere of will and political decision, they belong to the sphere of art, education, and therapy, where sensibility is shaped.[38]

The "chaoid" is an object which allows for a new mode of dis- and reconnection. It circumvents the rationalizing and negentropic impositions of digital resemblance-making processes, with their exclusive focus on positive phenomena. A chaoid for disentanglement might restore the idiographic internal linkages of subjectivity and consciousness, breaking the data image of thought in the process.

For the purposes of the present project, I maintain that psychedelic medicine can be considered a "chaoid" which belongs to the sensibility-shaping domain of therapeutic intervention. In order to substantiate this argument, I will explore the cognitive function of abstraction, or negation. What abstraction is, how it is constructed by the digital episteme, and, crucially, how abstraction appears to be altered by psychedelic substances are of highest importance here. I will proceed by explaining the first.

[38] Berardi, "The Mind's We," 20.

**Abstraction as Negation**

In his essay "The Power of Abstraction and Its Antagonism: On Some Problems Common to Contemporary Neuroscience and the Theory of Cognitive Capitalism," Matteo Pasquinelli questions the widespread philosophical belief that abstraction belongs to the domain of the mind rather than that of the body. As he writes, "abstraction" is often used in such a way that confirms the Cartesian binary.[39]

Pasquinelli opens "The Power of Abstraction" with a commentary on the Cartesian binary as it continues to inform intellectual debate:

> The philosophical debate of the last years, at least at the boundaries of French and Italian political theory, has been marked by a conceptual oscillation that has alternately emphasised immaterial labour or affective labour, knowledge economy or desire economy, the cognitive or the biopolitical. No research or political agenda have been immune from such a hypnotic spiral, which can be traced back to a millenary low-intensity hostility between the Western concepts of body and mind.[40]

As Bernard Stiegler and Eugene Thacker demonstrate, data instrumentalize affect and experience (which might be considered as "material") and cognition and knowledge (which might be considered as "immaterial") to the same ends. Although "no research or political agenda" may have retained immunity to the Cartesian "spiral," there is, then, at least some literature which recognizes the danger of remaining within the dualistic framework. Pasquinelli comments that "a common critique emerged that took the paradigm of cognitive labour to be overlooking the

[39] Matteo Pasquinelli, "The Power of Abstraction and Its Antagonism: On Some Problems Common to Contemporary Neuroscience and the Theory of Cognitive Capitalism," in *The Psychopathologies of Cognitive Capitalism: Part Two*, ed. Warren Neidich. (Berlin, Germany: Archive Books, 2014), 1.
[40] Pasquinelli, "The Power of Abstraction and Its Antagonism," 1

biological and genetic materiality of the body, and more importantly its libidinal and affective dimensions."[41] If his review is correct, Thacker's claims in *The Global Genome* — where he writes that the goal of biological exchange is "to define biology as information while at the same time asserting [its] materiality"— are especially anomalous.[42]

. Pasquinelli writes that the Cartesian divide forecloses a more accurate and incisive account of politics. He thus attempts to intervene in "the oscillation between these two poles," proposing as an alternative "a monistic paradigm where the opposition between body and mind, or bios and abstraction, may hopefully vanish."[43] He draws from the German philosophical tradition of *Lebensphilosophie* ("philosophy of life"), where "the living" "was rarely detached from a dimension of cognition and abstraction."[44] *Lebensphilosophie* permits Pasquinelli to grasp the politics of neurology from a non-dualistic perspective.

Interestingly, *Lebensphilosophie* appears to have influenced Foucault's work on normativity and biopolitics too. As Pasquinelli explains,

> the German-Jewish neurologist Kurt Goldstein [who was associated with *Lebensphilosophie*] and his ideas of abstract behaviour and normative power of the organism are located at the root of Foucault's intuition of biopower. In this reconstruction the cognitive paradigm is turned inside-out: it is in order to understand the body that we start once again from the brain, it is at very core of the bios (and the whole matter) that abstraction is found at work. The cognitive does not emerge after the evolution of a naked

[41] Pasquinelli, "The Power of Abstraction and Its Antagonism," 1.
[42] Eugene Thacker, *The Global Genome: Biotechnology, Politics, and Culture*. (Cambridge, MA: MIT Press, 2005)
[43] Pasquinelli, "The Power of Abstraction and Its Antagonism," 2.
[44] Pasquinelli, "The Power of Abstraction and Its Antagonism," 2.

> life (and maybe just to become its very enemy), but it innervates the living matter since its constitution.[45]

Despite the popular misperception, the capacity for abstraction does not result from *bios*, with its dual connotations of propriety and political subjectivation. While abstraction may be seized by politics, it does not depend on it. Situating himself alongside Berardi, Moulier Boutang, and the broader cognitive capitalism research program, Pasquinelli attempts to theorize cognitive capitalism beyond Cartesian dualism. This is because abstraction cannot be accurately described using theoretical frameworks which legitimize the mind-body divide. Pasquinelli emphasizes that while the power of abstraction is the primary casualty of the data episteme, this fact does not deny that data also violate phenomena conventionally understood to be material.

The above does not resolve the question of what, exactly, the function of "abstraction" entails in practice. Pasquinelli partially answers this question by suggesting a connection with neuroplasticity, the capacity for the physical structure of the brain to change over time, including into older age. Returning again to Foucault, he writes that "it is not an exaggeration to affirm that neuroplasticity … was the original inspiration of the notion of biopower."[46] Having already noted that "ideas of abstract behavior" informed Foucault's elaboration of "biopower," Pasquinelli is left with the task of corroborating the relationship between neuroplasticity and abstraction. Towards this end, he draws from Deleuze and Guattari:

[45] Pasquinelli, "The Power of Abstraction and Its Antagonism," 2.
[46] Pasquinelli, "The Power of Abstraction and Its Antagonism," 2.

> The problem of abstraction is central for Deleuze and Guattari too, despite emphasis throughout the last few decades on the desiring and affective side of their ontology. In their mission to sketch a materialistic ontology and materialistic logic they transformed and subsumed all the metaphysical and transcendental models of modern philosophy within the immanent notion of the abstract machine. Here the term "machine" indicates the very contingent and productive process of abstraction, the connection of different and even radically different substrates and also the projection and "assemblage" with the infinite and the void. The Abstract Machine is a universal concept introduced so as to ground a manifold ontology.[47]

Pasquinelli's abstraction refers to "the connection of different and even radically different substrates."[48] These substrates might be unique ontological qualia, or perhaps even distinct images of thought. Abstraction is the force which assembles these figures as a single plane. This composite ontological dimension respects the singularity of its subcomponents. Pasquinelli quotes Deleuze and Guattari to illustrate the abstract machine as an amalgam of "pieces" and "individuals:" "its pieces," they write, "are the various assemblages and individuals, each of which groups together an infinity of particles entering into an infinity of more or less interconnected relations."[49]

Although Pasquinelli's definition is expansive, it speaks directly to the role that abstraction plays in the schemata of both biopolitics and cognitive capitalism. Abstraction, he claims, yields both capital and power:

---

[47] Pasquinelli, "The Power of Abstraction and Its Antagonism," 5.
[48] Pasquinelli, "The Power of Abstraction and Its Antagonism," 5.
[49] Deleuze and Guattari quoted in Pasquinelli, 2014

> Despite having such a cosmological depth, the notion of abstract machine can also be used to explain the role of abstraction in the mundane paradigms of both biopower and cognitive capitalism: the abstract machine points to a power of abstraction that is able to abstract from its substrates and to produce the universal equivalent of capital and power (biopolitics).[50]

If the abstract machine acts upon a particular ontological entity, repeating it as an object that can be brought into equivocal relation, any property which cannot withstand this altering repetition is excluded. Digital knowledge production — or, in other words, digital resemblance-making — is one form of "altering repetition." Pasquinelli writes that all mental functions alter and repeat:

> This is also the ability of mind: its ability to make connections, but also to sever them, to negate them or to repeat them to infinity… indeed, Deleuze and Guattari's notion can be very useful to mediate between political economy and neurology, where the abstract machine could be intended as the ability to escape the limit of the brain and the organism, to expand towards an external memory and include the whole universe as an extension of the mind.[51]

This is the junction at which neuroplasticity may be analogized with abstraction. Here, Pasquinelli draws abstraction into the domain of human subjectivity (what some may call the "soul," "psyche," or "consciousness"). This object is vulnerable to distortion and

[50] Pasquinelli, 2014
[51] Pasquinelli, "The Power of Abstraction and Its Antagonism," 6.

misappropriation by abstracting machines, including the abstracting mechanisms of the data episteme.

Pasquinelli proceeds to note that Marxist philosopher Paolo Virno similarly conceived neurological activity as vulnerable to political power:

> Virno takes … mirror neurons as the proof of a naturalistic basis of human nature and as the basis of the preindividual sphere of inter-subjectivity that is supposed to be a given before the constitution of the human identity: The relation of a human animal to its own kind is assured by an original "intersubjectivity" that precedes the very constitution of the individual mind.[52]

Like Berardi,Virno is interested in an irreducible multiplicity of mind:

> The "we" exists even before we can speak of a self-conscious "I"' (Virno 2004, 175). In this view there is a common empathy between the individuals of the same species that is rooted before any linguistic faculty. Mirror neurons allow Virno to sketch a theory of political agency based on a collective intersubjectivity that is only afterwards crossed and cut by the ambivalence of language and the violence of negation.[53]

[52]Pasquinelli, "The Power of Abstraction and Its Antagonism," 7.
[53]Pasquinelli, "The Power of Abstraction and Its Antagonism," 7.

The pre-linguistic basis of this "common empathy" might fall into the scope of *zoê*, the domain of life itself that is not-proper. However, language and the negating properties of human thought complicate Virno's originary intersubjectivity. As Pasquinelli observes,

> Virno critiques this substrate of human nature with the introduction of two other logical steps: first, the power to negate natural empathy and communality with other human beings; and, second, the power to negate this negation, to reconstitute the public sphere in a proper constituent sense. What is interesting for Virno is the fact that mirror neurons do not explain the power of negation, while the most peculiar trait of human thought is precisely the ability to negate.[54]

He adds supplementary context for the problem of negation:

> Virno's account appears to be rigorous within the tradition of Analytical Philosophy, but mirror neurons can be contextualised in a different way within the holistic logic that spans from German Idealism and *Gestaltpsychologie* [Gestalt psychology] to the more recent theory of "enaction." Virno seems to forget that the very power of negation (which I prefer to call "power of abstraction") can be innervated deep into the structure of perception and sensation. There is no ontological difference between thought and perception, abstraction and negation.[55]

[54]Pasquinelli, "The Power of Abstraction and Its Antagonism," 7.
[55]Pasquinelli, "The Power of Abstraction and Its Antagonism," 7.

Following his discourse on Virno, Pasquinelli claims that mirror neurons and the negative capacity of thought might both inhabit the space of the material, or the unrefined matter of life itself. This allows for an even simpler definition of abstraction. To abstract is to negate, an operation which is essential to all thought and perception.

Pasquinelli positions Gestalt psychology as a space in which "holistic" theoretical reasoning and scientific data may be reconciled through the function of abstraction:

> As much as a century ago, Gestaltpsychologie showed that the visual perception of figures is based on the brain's holistic power to generalise points and abstract lines. More recently Noë (2004, vii) has recalled this position: "perception and perceptual consciousness depend on capacities for action and capacities for thought; perception is... a kind of thoughtful activity." The theory of mirror neurons finds itself along the epistemological border where the scientific data of neurophysiology and the holistic logic of neurophenomenology look into each other as through a broken mirror. For sure, a new paradigm will emerge along this fault line.[56]

This paradigm would have to confirm that the substrate of neurophysiology — that is, the non-digital matter of brain and consciousness — is qualitatively distinct from the discretized medium of data. Pasquinelli writes that the brain's ability to generalize points and lines is a function of negation. The perception of a stable line, point, or indeed any single object reflects the refutation of a continuous, infinitesimally reducible flow of sensoria. Datafication, by contrast, does not negate. It instead repeats and amplifies certain features of the datafied object. It is for this reason

[56] Pasquinelli, "The Power of Abstraction and Its Antagonism," 7.

that I have used the word "negentropic," or anti-entropic, to characterize digital activity. While data can abstract in the sense of making connections through network properties, they cannot negate.

When the mind and data are brought into relation, the mental capacity for abstraction is always violated. Wark's perception that abstraction "actualize[s] a relation out of infinite relationality" corresponds to the negativity of this operation.[57] One single relation is made among countless possible others; it is reduced, distilled to a single connective ligament. This is the same idiographic link that is disconnected by cognitive capitalism, only to be rerouted in the direction of the technologized economic flow. In the following pages, I will explore research from contemporary psychedelic science which indicates a possible causal link between psychedelic drug use and the concept of abstraction as it has been defined in the preceding sections. Specifically, I examine the ways in which psychedelic experience can catalyze the production of new metaphors and verbal content. This phenomenon has been demonstrated by current investigations on the relationship between psychedelic experience and language production.

**The Psychedelic Production of the Unique**

Qualitative investigations constitute a small, burgeoning movement within psychedelic research. The character of psychedelic therapy calls for a strategic commitment to a holistic understanding of individual research factors — a perspective that affirms the context-sensitivity of these variables. Psychedelic research also benefits from a self-reflexive acknowledgement of scholarly bias. In qualitative psychedelic studies, both of these principles are addressed by approaches

[57] Wark, *A Hacker Manifesto*, 16

which privilege subjective and hermeneutic meaning-making to a similar, if not greater, degree as quantitative and computational analysis.

The need for researchers affirm a thorough entwinement between themselves, their subjects, and the data they produce has been suggested by journalist Michael Pollan in his 2018 book *How To Change Your Mind: What The New Science of Psychedelics Teaches Us About Consciousness, Dying, Addiction, Depression, and Transcendence*. Throughout *How To Change Your Mind*, he notes that the various causes and effects of psychedelics are structurally entangled. As he explains, they cannot be detached "from the context in which [the treatment] is administered, the presence of the therapists involved, or the volunteer's expectations."[58] The psychiatric advantage of psychedelics evidently relies on a sort of Gestalt characteristic wherein the therapeutic encounter is felt to supersede the sum of its parts. In turn, the medically effective properties of psychedelic substances may not resemble discrete categorical objects.

This rationale is taken up by psychedelic psychologists Stoll Turton, Robin Carhart-Harris, and David Nutt. Noting the constraints inherent to quantitative and measurement-based methods, they write that they deployed a methodological approach based on interpretative phenomenological analysis, a technique said to be "the most appropriate to use to explore human experience" in their work.[59] The fact that they portray their research as an exploration of human experience not necessarily restricted to illness or suffering deserves further remark. Nutt, Carhart-Harris and Turton count among a number of psychedelic researchers who view these

---

[58] Michael Pollan, *How To Change Your Mind: What The New Science of Psychedelics Teaches Us About Consciousness, Dying, Addiction, Depression, and Transcendence*. (New York, NY: Penguin Press, 2018), 333.

[59] Stoll Turton, David J. Nutt, and Robin L. Carhart-Harris. "A Qualitative Report on the Subjective Experience of Intravenous Psilocybin Administered in an FMRI Environment." *Current Drug Abuse Reviews* 7, no. 2 (2015), 2.

substances not only as palliatives, but also as powerful tools for the exploration of the psyche.[60] Psychologist Stanislav Grof observes that "the potential significance of LSD and other psychedelics for psychiatry and psychology was comparable to the value the microscope has for biology or the telescope has for astronomy."[61] Accepting this view, research performed on them stands not only to impact treatment, but also to furnish new perspectives on healthy, high-functioning minds.

Strategies in which subjectivity, holism and self-reflexivity are privileged may be necessary to bring these perspectives to light. Here, information and interpretation take multiple directions as they flow between patients, clinical practitioners, and research scientists. Significantly, the methods which may be most essential to psychedelic science are grounded in philosophies that challenge the production of knowledge bodies based exclusively on digital data. In recent years, scholars have named the uncritical acceptance of a positivist and inductive ground of epistemology among other philosophical missteps of this digital fundamentalism. Pasquinelli counts among them. In his 2017 essay "Machines That Morph Logic: Neural Networks and the Distorted Automation of Intelligence As Statistical Inference," he interrogates the notion that digital procedures can be likened to human cognition and intelligence in any meaningful sense. He prefaces this argument by qualifying the difference between the logical procedures of induction, deduction, and abduction:

> By induction, we conclude that facts, similar to observed facts, are true in cases not

[60] Turton, Nutt, and Carhart-Harris, "A Qualitative Report on the Subjective Experience of Intravenous Psilocybin Administered in an FMRI Environment," 2.

[61] Author unknown, "Grof, Dr Stanislav."Accessed August 17 2018. https://allaboutheaven.org/sources/669/147/grof-dr-stanislav

> examined. By hypothesis [a function of abduction], we conclude the existence of a fact quite different from anything observed, from which, according to known laws, something observed would necessarily result. The former is reasoning from particulars to the general law; the latter, from effect to cause. The former classifies, the latter explains.[62]

Departing from there, Pasquinelli writes that Frank Rosenblatt, one of the earliest inventors of automated intelligence, intended his programs to automate complex forms of induction, not abduction.[63] While they may occasionally resemble abduction, they do not surpass the basic restrictions of this original design. As Pasquinelli puts it,

> The complex statistical induction that is performed by neural networks gets close to a form of weak abduction, where new categories and ideas loom on the horizon, but it appears invention and creativity are far from being fully automated [...] if pattern recognition via statistical induction is the most accurate descriptor of what is popularly termed Artificial Intelligence, the distorting effects of statistical induction on collective perception, intelligence and governance (over-fitting, apophenia, algorithmic bias, "deep dreaming", etc.) are yet to be fully understood.[64]

He writes that artificial intelligence, generally regarded as the form of computational cognition which most closely resembles human mentality, reduces cognition to "pattern recognition via

---

[62] Matteo Pasquinelli, "Machines That Morph Logic: Neural Networks and the Distorted Automation of Intelligence As Statistical Inference," *Glass Bead*, 2017

[63] Frank Rosenblatt was the first to conceptualize and program neural networks, the structural basis for contemporary artificial intelligence (see Pasquinelli 2017)

[64] Pasquinelli, "Machines That Morph Logic," 2017

statistical induction." The production of epistemic content via inductive generalization is an essential operation of machinic intelligence. Importantly, this operation contrasts with his description of thought, abstraction and negation in "The Power of Abstraction and its Antagonism."

In an article designed to introduce machine learning — the technical basis for artificial intelligence — to non-technologists, computer scientist Pedro Domingos echoes Pasquinelli's comments on machine intelligence. "The fundamental goal of machine learning," Domingos explains, "is to generalize beyond the examples in the training set."[65] In other words, machine learning programs inferentially predict or describe phenomena prior to their actual existence. By this reading, it appears that programmers should not apply a priori interpretative frameworks to the data they use to develop new programs. Such prior considerations, however, are technical requirements. Domingos writes that machine learning programs "must embody some knowledge or assumptions beyond the data [they are] given in order to generalize beyond it."[66] These embodied assumptions impose certain limitations on the final data output, even if the iterative processes to which these outputs have been subject obscures their origins. As he observes, machine learning programs must anticipate heterogeneity in the data they will process. Their original preconceptions should, therefore, be broad and inclusive. Domingos writes that they typically include "smoothness, similar examples having similar classes, limited dependencies, or limited complexity."[67] He offers that the alleged universality of these preconceptions contributes to the overall success of machine learning as a digital method.

---

[65] Pedro Domingos, "A Few Useful Things to Know about Machine Learning." *Communications of the ACM* 55, no. 10 (January 2012): 78.
[66] Domingos, "A Few Useful Things to Know about Machine Learning," 78.
[67] Domingos, "A Few Useful Things to Know about Machine Learning," 78.

In spite of their usefulness, however, these assumptions have unintended side effects — although such eventualities may not be easily traceable to their root. Facility with philosophical reasoning can be helpful toward detecting the epistemic biases intrinsic to artificial intelligence. In his book *Machine Learners: Archaeology of a Data Practice*, media theorist Adrian Mackenzie draws from the disciplines of computer science and philosophy to claim that the assumptions codified in machine learning systems effect ontological transformations in their subjects.[68] Naming Foucault and philosopher Ian Hacking as his influences, Mackenzie is primarily concerned with the impact of statistical probability and metrical comparison on the subjects of automated inference, referencing the history of naïve Bayes classification and linear regression to argue that computational output occupies "a reality that had already introjected statistical realities at least a century earlier." [69] For this reason, digital "knowledge" always bears the ontological signature of its ancestors. According to Mackenzie, the knowledge produced by machine learning cannot be scientifically objective, even in the ostensibly neutral domains of mathematics and computer science.

Regardless of whether they are the products of ontological alteration or not, it is at least true that the data output of machine learners are restricted by the presuppositions whose necessity is declared by Pedro Domingos. The presuppositions identified by Domingos may indeed be "safe bets" in most cases. However, they demand close attention in the context of systems which attempt to simulate the complex processes connoted by terms such as "thought," "cognition," "abstraction" and "intelligence," as these assumptions reify and naturalize biases in the guise of scientific objectivity. Herein lies the main concern of Pasquinelli: the restrictions at

[68] Adrian Mackenzie, *Machine Learners: Archaeology of a Data Practice,* 2017
[69] Mackenzie, *Machine Learners*,122-123.

the heart of computer cognition place it within an epistemic and ontological domain very much separate from that of abstraction as a mental function. Although their functions may weakly appear to reconcile different ontological substrates, they never entirely supersede induction to genuinely achieve this aim. Having listed scientific discovery and the development of metaphor as indicators of bona fide abstraction, Pasquinelli implies that theory and praxis from fields outside of computer science are poised to comment on the structural belief in computational cognition. The rationale given for the application of non-digital methods in psychedelic research is fruitful territory for such interdisciplinary commentary.

Thoughtful reflections on qualitative methods have already been written by a number of psychedelic scholars. In chapters four and five, I explore this literature in greater detail. Here, I will highlight two especially notable studies. A 2017 article on the drug ibogaine — known for its use in treating addiction — claims that phenomenological methods were used in research procedures because "both researchers and participants are unable to precisely describe these subjective experiences without simultaneously interpreting them based on past knowledge and personal experiences." [70] Meanwhile, after an investigation of psilocybin for its potential to relieve duress associated with cancer, researchers determined that their interpretative strategies "revealed a complex, multilevel set of processes" in which patients felt the treatment to be "relationally embedded, physically embodied, affect laden, deeply meaningful, and biographically instantiated."[71]

[70] Eduardo Ekman Schenberg,"A Phenomenological Analysis of the Subjective Experience Elicited by Ibogaine in the Context of a Drug Dependence Treatment." Journal of Psychedelic Studies 1, no. 2 (2017): 75.

[71] Alexander B. Belser et al., Patient Experiences of Psilocybin-Assisted Psychotherapy: An Interpretative Phenomenological Analysis." *Journal of Humanistic Psychology* 57, no. 4 (2017): 27.

In the psilocybin study, researchers derived categories and recurring motifs after evaluation of these reports, classifiers deemed essential to the conclusions ultimately drawn. While classification can be and frequently is performed by automated systems, these procedures are distinct from machinic classification in that investigators emphasized self-awareness of the unique bias and subject position they brought to their endeavor. This is, in fact, standard practice: interpretative phenomenological analysis requires its practitioners to relinquish objectivity as a scientific ideal. Researchers thus do not cast themselves as bias-free — a merit often attributed to machine intelligence — but rather as occupying ineluctable subject positions. Advocates for interpretative phenomenological analysis in particular do not believe the consciousness of investigators to be separable from their objects of study. They maintain that the best science will be done by treating the irreducible entanglement of subject and object as an epistemic strength as opposed to a shortcoming.

Profoundly reliant on subjective and Gestalt dynamics, qualitative psychedelic science undermines the rationale of digital methods. To be sure, however, this methodological paradigm occupies a minority position within the psychedelic renaissance. Non-computational methods are almost always offered as complements to computational techniques. In her 2017 presentation "The Role of Poetic Language in Psychedelic Experience," psychedelic scholar Neşe Devenot explains that

> most psychedelic research to date has been quantitative and nomothetic. These studies test for pre-established outcome measures, like levels of depression or anxiety, and they generalize trends across multiple cases through statistical analysis. In recent years, researchers including Alexander Belser and Gabrielle Agin-Liebes have argued for the

importance of complementing these quantitative studies with more qualitative, idiographic research into the narrative content of individual psychedelic experiences.[72] The generalization of trends using statistical analysis is a task well fit for machine learning systems — and so it should be: no psychedelic researcher argues for the total relinquishment of digital tool use. Advocacy for increased qualitative and idiographic supplements emerged after the psychedelic renaissance had already integrated contemporary digital methods. The use of qualitative methods has not come at the expense of the precision and standardizability provided by quantia and computation. Still, an examination of the attitudes held by psychedelic scientists and critical theory would suggest that the former does not necessarily share the particular perspective on cognition and abstraction that prevails in the latter.

These groups are, however, united by their express investment in ontological and phenomenological uniqueness, whether in the context of intelligence, the psyche, or the psychoactive impact of chemical compounds. Mackenzie writes that although machine learning systems are not always based on probabilistic models, they "relate to themselves and the data as populations defined by probability distributions."[73] This positionality elides individual character by reducing individuals to a series of statistical deviations and averages, binding them to the finitude of what Pasquinelli has termed "semiotic planes," the limits of which are transcended in the production of metaphor and in novel scientific discovery, among other acts of abstract cognition.

In a striking parallel with Pasquinelli, Devenot writes that the use of non-computational interpretative techniques may be justified by a recurrent phenomenon in psychedelic research

[72] Devenot, 2017
[73] Mackenzie, *Machine Learners*, (Cambridge, MA: The MIT Press, 2017), 123.

subjects, which is the invocation of metaphor to describe their experience. To make this claim, she draws on the work of linguist R. S. Sharma who has stated "that the fundamental function of poetic language is '"to convert denotation into connotation, the language of [objective] reference into that of feeling and mood."[74]

From here, Devenot writes that

> Poetry employs creative metaphors to communicate subtle nuances of subjective experience, and the poetic transfer of meaning inherent to metaphor-making constitutes a universal linguistic device for communicating novel and unprecedented experiences. In the process of verbalizing the interiorized effects of moderate- to high-dose psychedelics, poetic language and creative metaphors are often evoked spontaneously. Since scholars of poetry are trained to discern meaning in non-ordinary language, literary scholars are well positioned to make meaningful contributions in the context of qualitative research that seeks to determine the significance of psychedelic trip reports.[75]

I believe that the use of qualitative methods here allows psychedelic scientists to perceive a psychedelically-induced break of the data image of thought, and prevent the preemption of abstraction in automated systems. The use of hypothesis-generating methods leads to insights which indicate a particular connection between psychedelic psychotherapy, abstraction, and negation. However, psychedelic methodological philosophies have varied greatly over time. In the following chapter, I take a historical approach to explore the ways in which the effectuality

[74] Devenot, 2017
[75] Devenot, 2017

of psychedelic psychotherapy implies a patently “psychedelic” way of producing knowledge. The psychedelic way of doing science subverts the political activity of the data episteme.

## Chapter 4: A "Science of Psychedelics" or a "Psychedelic Science?:" Historical Perspectives on Methodology

*The introduction of open-minded, multiple-level, continuously developing, on-line, operational, dynamic, economical, expanding, structural-functional, field-jumping, field-ignoring theory is needed.*

John C. Lilly, *Programming and Metaprogramming in the Human Biocomputer*[76]

### Introduction: When Did Psychedelic Science Begin?

On April 16, 1943, the Swiss chemist Albert Hoffman accidentally absorbed a little-known substance through his fingertips. Hoffman had been investigating possible medical uses for lysergic acid diethylamide, a synthetic derivation of the fungus ergot.[77] In his book *LSD My Problem Child: Reflections on Sacred Drugs, Mysticism and Science*, he recalls having a "peculiar presentiment" that the chemical contained properties other than those observed in earlier analyses.[78] To be sure, Hoffman was aware that ergot can yield psychoactive effects. Moreover, he knew that the particular ergot alkaloid under study was highly unstable, and thus inclined to respond unpredictably to even the smallest chemical alterations.[79] Nevertheless, he was very much surprised by what happened next. As he writes,

> I was forced to interrupt my work in the laboratory in the middle of the afternoon and proceed home, being affected by a remarkable restlessness, combined with a slight dizziness. At home I lay down and sank into a not unpleasant intoxicated-like condition,

[76] John Cunningham Lilly, *Programming and Metaprogramming in the Human Biocomputer: Theory and Experiments*. Portland, Or.: Coincidence Control Publishing, 2014.
[77] The original German gives the name as Lyserg-säure-diäthylamid; this is why the abbreviation is "LSD" rather than "LAD." David Healy, *The Creation of Psychopharmacology*. (Cambridge, MA: Harvard University Press, 2002), 179
[78] Albert Hoffman, *LSD My Problem Child: Reflections on Sacred Drugs, Mysticism and Science* (New York: McGraw-Hill, 1980), 11.
[79] Hoffman, *LSD My Problem Child*, 11

> characterized by an extremely stimulated imagination. In a dreamlike state, with eyes closed (I found the daylight to be unpleasantly glaring), I perceived an uninterrupted stream of fantastic pictures, extraordinary shapes with intense, kaleidoscopic play of colors. After some two hours this condition faded away.[80]

Duly intrigued, Hoffman set out to duplicate the experience, this time under controlled conditions. Three days later, he self-administered what he believed to be a very small dose. The results were unambiguous. "The altered perceptions were of the same type as before," Hoffman recalls, "only much more intense. I had to struggle to speak intelligibly."[81] This second encounter, now considered the first formal study of LSD, confirmed that the drug was indeed responsible for Hoffman's initial flight from reality.

This event is sometimes described as the birth of psychedelic science. But while 1943 marks a definite milestone, there is little agreement on when the field officially began. It should be noted that psychoactives within and beyond the psychedelic category have been used as medicine for thousands of years. Psychiatrist Marc-Antoine Crocq writes that the medicinal use of opiates is well-documented throughout human history. He makes reference to a scene from Homer's *Odyssey* in which Helen of Troy mixes wine with the fabular potion *Nepenthes pharmakons* to lift the flagging spirits of her houseguests.[82] Several scholars have pointed out that the effects of *Nepenthes* are similar to those of opiates, and some argue that it clearly contains the drug now known as opium.[83] Regardless of the chemical basis for *Nepenthes*, it is at

[80] Hoffman, *LSD My Problem Child*, 12.
[81] Hoffman, *LSD My Problem Child*, 12.
[82] Homer, *The Odyssey*, trans. Robert Fagles (New York, NY: Penguin Putnam, 1996), 131.
[83] P.G. Kritikos and S.P. Papadaki, trans. George Michalopoulus, "The history of the poppy and of opium and their expansion in antiquity in the eastern Mediterranean area." *Journal of The Archaeological Society of Athens*, 1967, 17-38.

least true that Helen of Troy dispensed alcohol for mental relief. Alcohol, of course, is psychoactive unto itself, and its use in relieving psychic ills is globally and historically ubiquitous.

Considering the ancient history of psychoactive medicine, and the additional point that the word "psychedelic" was only coined in 1958, it is difficult to determine a chronological origin for psychedelic science.[84] Psychiatrist Torsten Passie suggests that the field began with the first scholarly documentation of drug-induced hallucinations. In "Contemporary Psychedelic Therapy: An Overview," Passie writes that while "therapeutic effects of hallucinogenic drugs have been known for millennia, their scientific investigation first began in the 20th century."[85] Although the field did not flourish before the emergence of LSD, he argues that analyses of mescaline from the 1920s should be considered as early instances of psychedelic investigation.[86]

There is, however, a crucial difference between mescaline and LSD. Unlike mescaline, LSD tends to provoke expressive speech and gestures from its subjects. As Passie explains, "the first clinical experiment with the highly effective hallucinogen LSD made evident the psychodynamic components of the hallucinogenic experience."[87] For this reason, researchers soon came to prefer LSD over mescaline. LSD was not only identified as the most suitable hallucinogen for study, but was also the first to be used in psychotherapeutic practice.[88]

---

[84] Ben Sessa, *The Psychedelic Renaissance: Reassessing The Role Of Psychedelic Drugs in 21st Century Psychiatry and Society*. (London: Muswell Hill Press, 2012), 62.
[85] Torsten Passie. "Contemporary Psychedelic Therapy: An Overview" in Winkelman, Michael James, and Thomas B. Roberts ed., *Psychedelic Medicine: New Evidence for Hallucinogenic Substances as Treatment*. (Westport: Greenwood, 2007), 45-68.
[86] Passie, "Contemporary Psychedelic Therapy: An Overview," 45-68.
[87] Passie, "Contemporary Psychedelic Therapy: An Overview,"45.

[88] Passie, Torsten. "Contemporary Psychedelic Therapy: An Overview" in Winkelman, Michael James, and Thomas B. Roberts ed., *Psychedelic Medicine: New Evidence for Hallucinogenic Substances as Treatment*. (Westport, CT: Greenwood, 2007), 46.

LSD clearly deserves its place in psychedelic history. However, the idea that Hoffman's "problem child" led to the first instance of psychedelic science is misleading. Like Passie, I believe that subjective experience is, and always has been, the primary object of psychedelic inquiry. It is for this reason that I place the foundations of the field over a century prior to the discovery of LSD. My history of psychedelic science begins instead at the turn of the nineteenth century. To explain why this is so, it will be useful to review historical narratives from other psychedelic scholars.

**Psychotomimesis in Psychedelic Research History**

In his book *The Psychedelic Renaissance: Reassessing The Role Of Psychedelic Drugs in 21st Century Psychiatry and Society,* psychiatrist Ben Sessa writes that there have been three major periods of psychedelic research. He dates the first two as 1880-1930 and 1938-1976 respectively. The third refers to the contemporary "renaissance," which he suggests began in the late 1980s.[89] Sessa notes that the first period focused largely on mescaline, although "hashish and opium were also popular at the time."[90] While opium is not formally classified as psychedelic, its "dream-like qualities" were deemed responsible for the "creative meanderings" of many literary figures. As such, Sessa claims that writings about opium intoxication count as meaningful precursors to twentieth-century psychedelic reports.[91]

Historian David Healy agrees with Sessa's chronological framing. In his book *The Creation of Psychopharmacology*, Healy writes that nineteenth-century opium and cannabis literature informed the scientific hypothesis that drug effects might resemble endogenous

[89] Sessa, *The Psychedelic Renaissance*, 5.
[90] Sessa, *The Psychedelic Renaissance*, 5.
[91] Sessa,*The Psychedelic Renaissance*, 53.

psychosis. This literary canon includes such texts as Thomas de Quincey's *Confessions of an Opium-Eater*, Jean-Joseph Moreau de Tours' *Hashish and Mental Alienation,* and the hashish-inspired poetry of Charles Baudelaire. These, he writes, are among the first publications to compare chemical inebriation with mental illness:

> In 1845 Jean-Joseph Moreau de Tours had written a famous book, *Hashish and Mental Alienation*, in which he described the results of the experiments of the Club de Haschischins in Paris. Members of this club included the poet Charles Baudelaire and others who took hashish with results that were very like those found in Thomas De Quincey's celebrated *Confessions of an Opium Eater*. Moreau de Tours went on to speculate about correspondences between experiences induced by hashish and the forms of mental illness then being seen in the recently created French asylums. Moreau de Tour's extraordinarily imaginative leap was even more perceptive than it might first seem, since the exemplar of insanity in 1845 was still the delirious state and for this state hashish-induced disturbances are still an excellent model.[92]

For Healy, psychotomimesis is the most germane conceptual link between the aforementioned literary canon and contemporary psychedelic studies. Throughout *The Creation of Psychopharmacology*, he attests to psychotomimesis as a dominant paradigm throughout psychedelic history, writing that the concept took on heightened importance as the field became more standardized. As he explains, it was in their capacity as psychotomimetics that psychedelics first gained widespread scholarly attention. Moreover, the possibility of

[92] Healy, *The Creation of Psychopharmacology*, 180.

hallucinogen-induced psychotomimesis not only led to an expansion in psychedelic research, but in fact reshaped the theory and practice of the psy- sciences overall.

It is for this reason that psychedelics make an appearance in *The Creation of Psychopharmacology*, which, as the title suggests, chronicles the growth of psychopharmacological research and practice. Healy writes that psychedelic science and psychopharmacology have long been linked through chlorpromazine, the world's first antipsychotic medication. After discovering that chlorpromazine suppresses LSD effects, psychedelic researchers seized upon its strategic purpose for their endeavors: chlorpromazine could be used to control the duration of hallucinogenic encounters. The pairing of chlorpromazine and LSD furnished psy- scientists with the unprecedented ability to induce and resolve psychosis at will. This finding captures the attention of scientists with no prior interest in psychedelics. If psychedelic experience bore any resemblance to mental illness, they reasoned, psychedelics might illuminate dynamics of madness which had until then proven recalcitrant to outside observation. As Healy reports,

> Chlorpromazine, and later haloperidol, when given beforehand, blocked the effects of LSD and mescaline and when given afterward helped resolve the conditions they induced. Psychiatry, it seemed, had overnight become scientific. Madness could be induced and resolved within hours. If this was the case, it could surely be studied systematically, and would quickly give up its secrets.[93]

[93] Healy, *The Creation of Psychopharmacology*, 181.

With chlorpromazine came an increased ability to control psychedelic experience and thus more safely to explore any potential resemblance with pathological conditions. If Healy is correct, psychedelics play a larger role in the history of psychopharmacology than the mainstream record would suggest.

Armed with chlorpromazine as a failsafe, psychedelic investigators embarked on increasingly ambitious endeavors. Throughout the 1950s and 1960s, LSD was investigated as a treatment for alcoholism, neurosis, and several other common afflictions. It was also deployed by the Central Intelligence Agency as part of the infamous MK-Ultra trials, where LSD was administered to unwitting subjects in the interest of determining its value as a truth serum. Because the substance frequently spurred verbal reports of the unreal, fabulous, and divine, it was quickly judged to be ill-suited to this goal.[94] While not all studies of this era attempted to induce a "model psychosis," psychotomimesis provided theoretical orientation for a large portion of this era's peer-reviewed psychedelic literature. In the years preceding the birth of the term "psychedelic," in fact, "psychotomimetic" was the preferred scientific descriptor for hallucinogenic compounds.[95] It is understandable, then, that Healy places so much stress on psychotomimesis in psychedelic history.

In his emphasis on psychotomimesis, Healy implies that the scientific relevance of psychedelics is to be found in the particular ways in which their study extends and promotes established methodological precepts. One such precept is that individual cases of "madness" might furnish generalizable information to psy- science knowledge. The very notion of a "model psychosis" rests on the presumption that observable similarities between individual cases of

[94] "MK-Ultra," last modified August 21 2018. https://www.history.com/topics/us-government/history-of-mk-ultra#section_2
[95] Sessa, Ben. *The Psychedelic Renaissance,* 62.

disorder (or alleged disorder) will disclose important information regarding etiology, phenomenology, and potential avenues for treatment. This is almost certainly true for many, if not most, psy- science research areas. However, the major contribution of psychedelics to psy-science knowledge is not to be found in their positivistic capacity to resemble anything already known, as in classified disorders. They are, I maintain, chiefly important in their ability to confirm the role of the unknowable and the abstract in cognition. This capacity, moreover, challenges the psychopolitical mechanisms by which digital data have attained to their dominant political position.

Psychedelic science demands a specific approach to emphasize this capacity. This approach implicitly critiques the authority of data positivism, and as such, is particularly distinctive in the age of digital methods. It matters, however, that "psychotomimesis" is less important in other historical accounts. Recent critical historiographies show that psychedelic research has long challenged the epistemic dominion of positivism. I introduce this dynamic of psychedelic scholarship later in this chapter, and explore it in greater detail in chapter five. Here, it is incumbent to emphasize the point that psychedelic science has typically been considered subversive not for epistemic reasons, but because of social taboos and legal injunctions against the use of mind-altering drugs. By almost all official testimonies, moral and political exigencies are to blame for the relegation of all things psychedelic to the margins of society. However, a handful of scholars have offered the argument that difficulties associated with the scientific study of psychedelics must also be considered responsible for the field's persistent "otherness." In the next section, I address psychedelic science as marginal with respect to methodological norms.

**Psychedelics as "Other" in Science and Society**

Healy's psychedelic narrative supports the purpose of *The Creation of Psychopharmacology*, which is to present a historical timeline of the discipline of psychopharmacology. However, psychedelic science has never conformed to any one set of disciplinary standards, including those associated with empirical scientific research. As noted in chapter three, the character of psychedelic experience casts doubt on such scientific methodological values as falsifiability, reproducibility, and generalizability. To examine it through the lens of a different site of scientific investigation and practice risks subsuming its particularities under criteria which do not fully apply.

Social and political exigencies have also left an indelible mark on the field. Most scholarly reports state that research effectively ended in the wake of the Controlled Substances Act of 1970, which brought strong legal prohibitions against LSD, psilocybin, mescaline and related chemicals. By the mainstream account, the recreational use of psychedelics in the 1960s sparked a widespread moral panic, and fears of mass psychedelic chaos led to their strict prohibition in the United States by the end of the decade.[96]

The following passage appears on the website of the group Third Wave, a public benefit corporation which sponsors psychedelic medical initiatives. The excerpt opens with a quotation from Hoffman:

> As Albert Hofmann wrote in his book, "LSD: My Problem Child," "publicity about LSD attained its high point in the years 1964 to 1966, not only with regard to enthusiastic claims about the wondrous effects of LSD by drug fanatics and hippies, but also to

[96] See, for example, "The Mind, Explained: Psychedelics." Netflix Official Site, September 12, 2019. https://www.netflix.com/title/81098586.

> reports of accidents, mental breakdowns, criminal acts, murders, and suicide under the influence of LSD. A veritable LSD hysteria reigned." And then, as quick as the counter-cultural movement blossomed, it died. In 1968, the U.S. government declared possession of LSD illegal. In 1970, it declared LSD a Schedule 1 drug. When a drug is declared Schedule 1, it has, according to the government, "a high potential for abuse" and was without "any accepted medical use in treatment." Although there had been a myriad of positive results when used under controlled circumstances, the dissemination of LSD into the hands of mainstream USD caused its eventual prohibition.[97]

This passage reflects the story normally told about the rise and fall of psychedelic studies. In his article "Efficacy and Enlightenment: LSD Psychotherapy and the Drug Amendments of 1962," historian Matthew Oram challenges this interpretation. As Oram argues,

> The decline in therapeutic research with lysergic acid diethylamide (LSD) in the United States over the course of the 1960s has commonly been attributed to the growing controversy surrounding its recreational use. However, research difficulties played an equal role in LSD psychotherapy's demise, as they frustrated researchers' efforts to clearly establish the efficacy of treatment. Once the Kefauver Harris Drug Amendments of 1962 introduced the requirement that proof of efficacy be established through controlled clinical trials before a drug could be approved to market, the value of clinical research became increasingly dependent on the scientific rigor of the trial's design. LSD psychotherapy's complex method of utilizing drug effects to catalyze a psychological

[97] Paul Austin, "An Introduction To The History Of LSD." The Third Wave, July 9, 2019. https://thethirdwave.co/lsd-history/.

> treatment clashed with the controlled trial methodology on both theoretical and practical levels, making proof of efficacy difficult to obtain.[98]

Medical anthropologist Katherine Hendy provides important context for Oram's claim. In her article "Placebo Problems: Boundary Work in the Psychedelic Science Renaissance," she writes that the Kefauver Harris Drug Amendments were introduced after the infamous catastrophe associated with the drug thalidomide. As she explains, "the movement for double-blind placebo-controlled studies had been building over the course of the twentieth century but wasn't required by the FDA until after the thalidomide crisis, in which birth defects were linked to an anti-nausea drug prescribed to pregnant women."[99]

In practice, there are no reliable ways to apply a double or even a single blind testing process in research on psychedelic phenomenology. As Hendy puts it,

> Psychedelic therapy did not fit easily into the new institutional and methodological standards for research. Researchers posited that the complex relationship between the pharmaceutical and the psychological aspects of the drug made it difficult to study in double-blind placebo-controlled trials. Thus, the fact that psychedelics stopped being developed as pharmaceuticals had just as much to do with the inability of researchers to shift toward the new techniques for pharmaceutical research, as it had to do with the use of these drugs in the counter culture.[100]

---

[98] Matthew Oram, "Efficacy and Enlightenment: LSD Psychotherapy and the Drug Amendments of 1962." Journal of the History of Medicine and Allied Science 69, no. 2 (August 2012): 221.
[99] Katherine Hendy, "Placebo Problems: Boundary Work in the Psychedelic Science Renaissance." *Plant Medicines, Healing and Psychedelic Science*, 2018: 155.
[100] Hendy, Katherine. "Placebo Problems," 156.

Psychedelic intoxication has a rapid onset, and the effects are markedly distinct from rote consciousness. For these reasons, psychedelics almost always break attempted blinds for both subjects and observers. Certain studies have attempted to reinforce blinds by giving "active placebos" to the control group. Nicotinic acid and miniscule doses of the chemical under study have both been used to dissimulate psychedelic effects.[101] As far as the published literature shows, however, no active placebo is known to be reliable.[102]

The problem of attaining a successful research blind is widely acknowledged among scholars. If it is not the field's most trenchant obstacle, it is perhaps the best-documented. In his doctoral dissertation, which investigates psychedelic regulation policy, psychedelic advocate Rick Doblin describes the field's "primary methodological difficulty" as rooted in "the subjective effects of psychedelics, which provide both subjects and experimenters ample opportunity to guess accurately at a rate much better than chance whether subjects received either the test drug or a placebo."[103] In a research study published more than fifteen years later, psycholinguistics researcher Neiloufar Family indicates that while she attempted to blind her subjects, they were probably aware that they had received the active drug. "The effects of the drug are not subtle and this can theoretically break the blind," she admits, and she adds that her case exemplifies a "recurrent debate regarding using an active placebo in experiments with LSD and similar drugs."[104]

---

[101] Sessa, T*he Psychedelic Renaissance*

[102] Hendy, "Placebo Problems," 163.

[103] Rick Doblin, "Regulation of the Medical Use of Psychedelics and Marijuana." PhD diss. (Harvard University, 2001): 190. Note that Doblin is the founder of MAPS, the Multidisciplinary Association for Psychedelic Studies.

[104] Neiloufar Family et al. "Semantic Activation in LSD: Evidence from Picture Naming." *Language, Cognition and Neuroscience* 31, no. 10 (November 2016): 5.

The issue of double-blinding is not the only procedural complexity. It is significant, however, in that it highlights the intractable presence of subjectivity in the lived experience of a psychedelic trip. Individuals who receive active doses cannot dependably be fooled into believing they are sober. Moreover, because the drugs distort cognition so profoundly, it is often difficult to procure coherent verbal or written accounts from research subjects while in the midst of a clinical trial. For these reasons, the immanent features of psychedelic phenomenology tend to elude formal documentation. The data for scientific psychedelic reports are always, to some degree, removed from the experience itself. This may be a removal in time, as in subjects who offer testimonies only after the drug has worn off. More often, it is a removal by virtue of the fact that the data are primarily produced by outside observation, despite the fact that psychedelic experience is generally seen as inextricable from interiority.

Although drug policy has certainly stifled formal investigation, a salient history must also acknowledge the procedural considerations I have just outlined. Unlike political matters, these factors are not "external" to scientific endeavors. Rather, they implicate the "internal" normative practices of formal science. These "internal" forces have special implications for the relationship between psychedelic methodological approaches and the data episteme. Some scholars, however, claim that methodological subversiveness defines the field throughout its lifespan — well before the emergence of the data episteme.

**Humphry Davy's Methodological Innovations**

Neşe Devenot claims that psychedelic science has been methodologically "other" since its beginning. In her doctoral dissertation, she declares that the field properly began in 1799.[105]

[105] Neşe Devenot, "Altered States/Other Worlds: Romanticism, Nitrous Oxide, and the Literary Prehistory of Psychedelia," (PhD diss., University of Pennsylvania, 2015), 1

1799 is notable as the year in which the British chemist Humphry Davy began his study of nitrous oxide, commonly known as laughing gas.[106] Devenot writes that she begins her psychedelic historiography with nitrous oxide not because of the character of its effects, but because the circumstances under which it was discovered point to an important connection with later psychedelic experiments. "In contrast to the natural inebriants like opium cultivated for centuries," she writes, "nitrous oxide emerged from new laboratory procedures and experimental techniques."[107] In a striking overlap with LSD, the earliest recorded nitrous oxide encounter resulted from a laboratory accident. Devenot tells the story as follows:

> Combing through the newly discovered "factitious airs" (gases released from solid matter through chemical reaction) in search of new medicines to combat the epidemic of consumption, [Davy] found something of another order entirely: a non-toxic, easily respirable gas capable of unleashing exquisite pleasure while transporting consciousness temporarily into uncharted dimensions of existence.[108]

This serendipitous finding had the same effect on Davy's career as it would on Hoffman's years later: both figures relinquished long-standing career ambitions in order to map the foreign territory onto which they had stumbled. The birth of psychedelic science, then, can be said to have relied on two contingent factors: first, a laboratory mistake; second, the willingness of researchers to forsake a predetermined career path in pursuit of the novel and uncertain.

---

[106] Devenot, "Altered States/Other Worlds," 1.
[107] Devenot,"Altered States/Other Worlds," 1.
[108] Devenot, "Altered States/Other Worlds," 1.

An ethos of open-endedness defines psychedelic inquiry to this day. Since the time of Humphry Davy, psychedelic scholars have been amenable to methodological approaches with little to no precedent.[109] To be sure, this commitment to openness and flexibility does not apply uniformly. In every era of psychedelic science there have been multiple endeavors committed to the falsification of a single hypothesis or to treating a documented mental ailment. However, the role of indeterminacy is codified widely across the literature, where the unpredictable nature of psychedelic experience is often taken into explicit consideration.

Although no accidents have had the resounding influence of Hoffman's, haphazardness recurs throughout the psychedelic canon. Rhetorician Richard Doyle writes that the motif of the "mistake" is "legion" in trip reports from the online database Erowid, which collects such anonymous accounts.[110] As with LSD, many hallucinogens are active in miniscule amounts, and it is common for even the savviest experimenters to miscalculate their dosage. "Even extreme care is insufficient," Doyle warns. As he explains,

> a two-hundred-dollar scale is only accurate (even when properly used) within two milligrams, while even a friendly compound like 2C-I has a sufficiently steep response curve to make two milligrams significant indeed. Although this mistake would not be lethal, it could radically alter the qualitative experience, reminding us that tuning psychedelics is an exceptionally delicate affair—they are extraordinarily sensitive to initial

[109] This is characteristic of the career of Alexander Shulgin, which will be discussed later in this chapter, along with a suite of contemporary scholars whom I examine in chapter five.
[110] Richard Doyle, *Darwin's pharmacy: Sex, plants, and the evolution of the noösphere*. (Seattle: University of Washington Press, 2011), 47.

> rhetorical conditions, including that favorite rhetorical practice of Protagoras, the "measure." [111]

It is significant that Doyle characterizes the "measure" as both highly important and as a "rhetorical practice." In consigning the "measure" to rhetoric, he indicates that ostensibly objective scientific realities might in fact be constituted by interpretation. Although dose measurement can have grave consequences, he seems to suggest that measurement practices do not entail objectivity. At the very least, he does not privilege the epistemic validity of quantia over that of language acts, even in an empirical context. Instead, he indicates that both qualitative and quantitative methods are functions of signification.

The epistemic legitimacy of quantitative metrics is rarely decentered as such. The intellectual dominance of quantia certainly proved difficult in the case of Davy, who quickly discovered that his studies on nitrous oxide were better served by interpretative techniques as opposed to quantitative and metrical means. Meanwhile, Comtean positivism was gaining in popularity just as his Davy's career was gaining traction. In this passage, Devenot attests to his intellectual heresy:

> Davy's investigations clashed with increasingly dominant views about legitimate experimental methods and data in the practice of chemistry. While the chemist of an earlier generation trained and refined the body's "sensuous technology" to read subtle signals of chemical composition in tastes, scents, and color, the "new" chemist viewed evidence from the senses as inexact, incomplete, and inconclusive. Contemptuous of subjective,

[111] Doyle, *Darwin's Pharmacy*, 47.

> experiential reports for their lack of standardization, the new chemists based knowledge claims on objective measurements that relied on increasingly specialized and expensive laboratory instruments. In so doing, they insisted on a Newtonian view of material reality as inherently stable and uniform, where the "real" was increasingly synonymous with the measurable.[112]

While the above does not reference Auguste Comte directly, it seems likely that an eighteenth-century zeal for positivism had reached Davy's professional circle. It matters, then, that the young scientist's techniques were not so much informed by any particular intellectual rebelliousness, but rather by hermeneutic expediency. As Devenot writes,

> Nitrous oxide would not reveal its secrets to thermometers and gazometers alone.Without any objective, external method of measuring the form and content of the nitrous oxide experience, Davy necessarily relied on self experimentation and witness reports, drawn from the Pneumatic Institute's social circle of poets, philosophers, and physicians among whom were the Romantic poets Samuel Taylor Coleridge and Robert Southey. To translate ecstatic states of consciousness into narrative form, Davy and this circle depended on an irreducibly interdisciplinary network of interpretive tools, which became fundamental aspects of the Pneumatic Institute's scientific procedure.[113]

[112] Devenot, "Altered States/Other Worlds," 1.
[113] Devenot, "Altered States/Other Worlds," 2.

While contemporary scholars might deny legitimacy to self-experiments, this norm of modern science did not apply to Davy and others at the Pneumatic Institute, his long-term research facility. More problematic for Davy's time, Devenot asserts, was the experimental and interpretative nature of his research protocols.

**Perpetual Experimentalism**

In his book *The Age of Wonder: How the Romantic Generation Discovered the Beauty and Terror of Science*, Richard Holmes documents Davy's creative approach to experimentation in rigorous historical detail. "With his experimental subjects," Holmes reports, "Davy monitored pulse rates, and required them to undergo certain standard tests, such as gazing at a candle flame and listening to bells. He wanted to record physiological changes, such as distortions of vision and hearing. But gradually he became more and more interested in subjective responses."[114] Holmes writes that Davy soon began to select healthy individuals from among his "highly articulate" circle of friends. Devenot mentions that this group included the poets Robert Southey and Samuel Taylor Coleridge, who translated psychedelic experience into creative verse.[115] Holmes notes that Davy enlisted subjects of multiple vocations and personality types. This eclecticism incidentally led Davy towards one of his most significant findings:

> What Davy began to see was that reactions reflected personal temperament, as much as simple physiological changes. So what the musician Mr Wansey reported was an experience like "some of the grand choruses of the Messiah" which he had heard played

[114] Richard Holmes, *The Age of Wonder: How the Romantic Generation Discovered the Beauty and Terror of Science* (New York: Pantheon Books/Vintage Books, 2010), 68.
[115] Devenot, "Altered States/Other Worlds," 2.

> by 700 instruments in Westminster Abbey five years previously, while Southey's great friend, the down-to-earth radical tanner of Nether Stowey, Tom Poole, was reminded of climbing mountains in Glamorganshire.[116]

Davy's creative methods demonstrated an aspect of psychedelic experience which has since been demonstrated thousands of times over: it is highly individualized and dependent on idiographic qualities. Although nitrous oxide may not technically be classified as "psychedelic," the fact that its effects are so thoroughly intertwined with subjectivity marks a point of resonance. It is notable that Davy's methodological innovativeness illuminated this important detail.

Devenot maintains that Davy was prescient "in paving the way for modern medicine's continuing interest in the therapeutic potential of ecstasy," and she adds that the therapeutic benefit of ecstasy-inducing chemicals necessitated his break with procedural standards.[117] However, the work of Davy and his associates at the Pneumatic Institute is not solely responsible for the field's experimentalism. From its unorthodox beginnings to the present day, psychedelic science remains experimental due to the internal and external factors previously discussed. Moreover, because it has been niche for so long, the scholarly literature on psychedelic science is still evolving. Psychedelic scientists cannot rely on well-founded guidelines, as there are few to be found. Thus the "how" of their studies continues to demand originality and resourcefulness.

The role of informal and even illegal experimentation in the fiat psychedelic canon deserves some mention. Although almost all research came to a halt after the year 1970, a taste for psychedelics did not vanish with the new legal prohibitions. Drug-making operations instead

[116] Holmes, *The Age of Wonder*, 68.
[117] Devenot, "Altered States/Other Worlds," 2.

fled underground. Without any institutional oversight, self-styled chemists in makeshift laboratories were at liberty to pursue any goal they desired — and to observe few, if any, ethical or practical formalities. In this environment, all manners of "doing science" flourished with little regard for norms.

Most reports of underground psychedelic research are apocryphal and cannot be confirmed. What is certain, however, is that the biochemist Alexander "Sasha" Shulgin serves as this movement's figurehead. Although Shulgin was trained to work in institutional environments, he is best-known for synthesizing over two hundred psychedelic chemical compounds in his home laboratory. After psychedelics were prohibited, Shulgin obtained a DEA-approved license which allowed him to experiment on the substances with full legal clearance. In his self-built laboratory, Shulgin synthesized well-known chemicals, including LSD and MDMA, and he invented many more entirely new psychoactive drugs. The website for MAPS, the Multidisciplinary Association for Psychedelic Studies, features a lengthy obituary for Shulgin, who passed away in 2014. The tribute includes the following information:

> A century ago, mescaline was the only chemical substance known to science that today would unequivocally be called a psychedelic. By 1960, when Sasha experienced its effects, there were but a handful of additional psychedelic chemicals known: LSD (lysergic acid diethylamide) had been characterized by Albert Hofmann in 1943; psilocybin and psilocin were identified from Psilocybe mushrooms by Hofmann in 1958; lysergic acid amide had been identified, again by Hofmann, from the seeds of morning glories, used for shamanic healing ceremonies in Mexico; and DMT (dimethyltryptamine) had been characterized from several species of plants employed for

> their psychoactive effects by Amazonian shamans. Today, in the early 21st century, there are well over a hundred chemicals known to have psychedelic effects, some say over 200. The majority of these were discovered through chemical synthesis and testing by one man: Sasha Shulgin.[118]

Although he primarily worked alone, Shulgin made consistent efforts to share his research with as many people as possible. The memorial continues:

> Taking the chemical structure of mescaline as his starting point, he made, over a period of years, numerous molecular modifications, and very carefully tested the effects of each one, using himself as research subject. He published the results of his investigations in scientific journals—several hundred chemically unique compounds that had never before been synthesized and investigated, or even imagined.[119]

Throughout the second half of the twentieth century, Shulgin served as a sort of emissary between the psychedelic underground and the sphere of legitimate science. While he produced numerous articles in scientific journals, he also self-published instruction manuals in the interest of informing would-be chemists in the art of psychedelic manufacture.[120] Along with his wife Ann, he supported the cause of psychedelic-assisted psychotherapy, and he frequently consulted with psychotherapists who wished to use his chemical inventions in their practice.

---

[118] "Too Big for a Nobel Prize: Remembering Sasha Shulgin." MAPS. Accessed January 28, 2020. https://maps.org/news/383-bulletin-winter-2014/5433-too-big-for-a-nobel-prize-remembering-sasha-shulgin.

[119] "Too Big for a Nobel Prize."

[120] See http://www.shulginresearch.org/home/publications/

Shulgin has become something of a folk hero in psychedelic inquiry. He is lauded not only for pursuing psychedelic research despite significant bureaucratic obstacles, but also because of his decidedly Promethean approach to science. As the MAPS obituary notes, his work "was truly heroic" in part because "it is nearly impossible to do good science this way anymore: the old way—the way of Priestly, or Newton."[121] I would add that the "internal" and "external" forces which have long "othered" psychedelic science converge in the case of Shulgin, who worked in isolation largely due to issues of legality. Very few researchers were allowed access to the chemicals he developed on a routine basis. Like Davy, however, the methods he preferred were decidedly idiosyncratic, and it was perhaps easier to deploy them in the absence of institutional oversight.

The following account appears in a journalistic report on Shulgin's life which was published in *Wired Magazine* in 2002. The writer visited the aging Shulgin at home, and discovered that there is some truth to the chemist's mythos:

> When questions of taxonomy arise, Shulgin isolates and identifies specific compounds through chromatography. "Here I'm totally caught up in the Western tools of science," he says, as classical music blares from a transistor radio hanging from a ceiling beam. "Get a bit of plant into the test tube, shove the wet residue into the chromatographic monster, and you discover 20 new things in the plant." He shows me a small notebook with pages displaying the peaks and valleys of printed-out chromatography. "Bingo!" he says, pointing to an upward shift. "We've got activity." That's where the standard scientific method ends. Shulgin will sample an extremely low dose with Ann, then bring the

[121] Ethan Brown, "Professor X." Wired. Conde Nast, April 18, 2018. https://www.wired.com/2002/09/professorx/

> substance to the group with whom he tried P. pringlei. Sometimes his psychedelic adventures scare him, Shulgin says, "but how else are you going to learn?" In case the worst does happen, "I always keep an anti-convulsant on hand."[122]

To be sure, not all underground psychedelic scientists have been so daring in their techniques. Shulgin earned his legacy by demonstrating scientific acumen and bravery (or, perhaps, foolhardiness) in equal measure. On the other hand, above-ground psychedelic research has also called into question established (and decidedly "safe") means for proving the quality and efficacy of various hallucinogenic compounds. In the following section, I will explore the relationship between the history of psychedelic methodological experimentation and the field's epistemic alterity.

**The "Evidential Cultures" Model**

Normativity has played a fairly minor role in influencing the "evidential cultures" of both underground and above-ground psychedelic science. The concept of "evidential cultures" was first posited by Harry Collins, a scholar who has contributed widely to the sociology of scientific knowledge. After investigating the epistemic biases of gravitational wave research groups, Collins observed that cultural differences "affect what counts as scientific knowledge" across distinct sites of knowledge production — including those within the same specific arena.[123] This conclusion led him to claim that sociologists of scientific knowledge must relinquish stable notions of scientific truth, "at least in respect of the matter under examination and at least

[122] Brown, "Professor X."

[123] Harry M. Collins, The Meaning of Data: Open and Closed Evidential Cultures in the Search for Gravitational Waves." *American Journal of Sociology* 104, no. 2 (1998): 296.

temporarily." [124] The concept of "evidential cultures" observes the fact that cultural factors inform scientific epistemologies, and that these epistemologies manifest in the theoretical frameworks favored by various groups of scholars.

Luke Williams claims that the evidential cultures model brings to light major trends in psychedelic science methodology since the 1960s.[125] I would add that the model bears hermeneutic value throughout the field's history, if only because it appears ill-equipped to account for so many points of methodological and epistemological distinction. In other words, psychedelic science appears all the more anomalous when viewed through the "evidential cultures" lens. Specifically, it does not fit neatly into the three-axis framework of the model, where each axis reflects an angle of consensus-making and objectivity in scientific knowledge production. The first axis is called "high evidential collectivism versus high evidential individualism;" the second, "high versus low evidential significance;" and the third, "high versus low evidential thresholds."[126] Williams elaborates on each:

> Evidential collectivism is the belief that the responsibility for assessing the integrity of the results is the job of the larger scientific community. Evidential individualism, on the other hand, is the belief that it is the responsibility of the individual, or the individual team or lab, to ensure that their data is valid. High evidential significance means reporting statistical data as real phenomena; low evidential significance means reporting data with little real significance: in Collins' example, this involves reporting seeing "gravity waves" on the one hand, or simply seeing statistical "coincidences", with no theoretical claims… the final

[124] Collins, "The Meaning of Data," 296.
[125] Luke Williams, "Human Psychedelic Research: A Historical and Sociological Analysis."
[126] Williams, "Human Psychedelic Research: A Historical and Sociological Analysis." .

> dimension of evidential culture, identified by Collins, is the evidential threshold. This is simply the level at which results are considered as significant.[127]

I will begin my exploration of the "evidential cultures" and psychedelic science by remarking on the challenges associated with the axis of "high versus low evidential significance." It might be said that information which is not "real" would not normally be thought to be scientifically "significant," at least to the extent that science is concerned with what is real. However, psychedelic hallucinations are decidedly not "real," and chemically-evoked affective states, as in those produced by prescription medications, are sometimes characterized as "artificial." As psychedelic researchers derive meaning from data, they must be cautious in establishing the level of significance they ascribe to their subjects' "unreal" encounters. Researchers are thus urged toward philosophical reflection as they determine which features may or may not be "real,"or in other words, significant for their analytic goals.

Williams proposes a hypothetical scenario to depict the ways in which the variable of "evidential significance" might impact research outcomes.[128] After a psychedelic trial, he writes, investigators might report that a certain percentage of their subjects attained a transcendental state. In a study which establishes a high level of significance, scientists might report a causal link between a subject's transcendental experience and their subsequent recovery from alcoholism. By contrast, if the same trial established a low degree of evidential significance, researchers might simply document the percentage of subjects who attained transcendence, but not indicate a noteworthy connection between psychedelic experience and addiction recovery.[129]

---

[127] Williams, "Human Psychedelic Research: A Historical and Sociological Analysis." .
[128] Williams, "Human Psychedelic Research: A Historical and Sociological Analysis."
[129] Williams, "Human Psychedelic Research: A Historical and Sociological Analysis."

In the former case, correlation would appear to imply causation, and the conclusions drawn henceforth might be taken as spurious.

Williams corroborates this possibility, noting that "high evidential significance leads to high 'interpretative risk,'" and that this approach therefore presents "more chance of attracting opposition and more ways of being wrong."[130] By contrast, there is lower "interpretative risk" associated with a decreased measure of evidential significance. Whether researchers might infer causation from correlation, or break with any other methodological convention, cultures of "high evidential significance" face clear intellectual hazards. With the ascription of excessive significance to an "unreal" state of transcendence might come the danger of appearing to be unscientific, or worse, to practice on the basis of flawed research. If, for example, the subject who recovered from alcoholism happened to have a vision of a mythical animal while in their transcendental state, and if that vision was included as part of the "significant" information, scientists could draw a causal connection between visions of unicorns and the resolution of alcohol addiction.

Because psychedelic experience is both under-researched and invested in "unreal" subject matter, however, researchers have generally had to presume high levels of significance. Given the burgeoning state of the field, scientists cannot be so quick to dismiss research findings that may appear to be irrelevant. This bears out especially in analyses which foreground qualitative and continuous over quantitative and discrete research variables and methodological tactics, as the former give greater interpretative berth to researchers, and are less commonly associated with objective measures.

[130] Williams, "Human Psychedelic Research: A Historical and Sociological Analysis."

Per Collins' model, the degree of "evidential threshold" would also be relatively high in such studies. The following chapter more closely explores the relationship between digital methods and evidential significance levels. Here, it may be sufficient to simply note that this particular scenario encapsulates a theoretical debate regarding the role of interpretation and epistemic legitimation in psychedelic research after the digital turn.

From his three-axis framework, Collins derives two overarching categories of evidential cultures: "open" and "closed." By Williams' account, "an open evidential culture has a high degree of collectivism, low significance and low threshold," and "a closed culture has a high degree of individualism, high significance and high threshold."[131] As it tends to favor high evidential significance and threshold levels, most psychedelic research — including virtually all qualitative studies— appear to be "closed." However, in order for an evidential culture to be considered "closed," it must also demonstrate a high degree of individualism. Herein lies a major paradox: collectivism more rightly defines psychedelic inquiry throughout its history. Even in the era of Davy, research on mind-altering drugs was deeply influenced by social dynamics. Meanwhile, knowledge-sharing across laboratories, research teams, and underground scientists has been pervasive since the era of Hoffman. As in the case of Shulgin and the Erowid database, "underground science" and knowledge from illicit and formally undocumented use have found their way into fiat research. The integrity of psychedelic research has never been exclusively established by its official scientific community because, in many ways, the psychedelic science community has never been entirely "official" at all.

[131] Williams, "Human Psychedelic Research: A Historical and Sociological Analysis."

**Scientific Governance and Psychedelic Metricalization**

The subversive origins of psychedelic science intertwine with the political history of the psy-sciences. In the introduction to *The Creation of Psychopharmacology*, Healy observes that the psy- sciences, as a distinct category of knowledge-production practices, emerged in the wake of Enlightenment-era political concerns. The decline of theological governance structures in political life, he claims,

> led to a need to discover new means for nations to govern themselves. This entailed over time a transformation in social relations between people. Since these relations were no longer determined by social hierarchy in the same way as before, there was a need for a new set of sciences to map the new terrain, the sciences of man, one of which was psychology. [132]

This passage reveals what could be termed a Foucauldian trace in Healy's work. While he does not radicalize his historical project to the same degree as Michel Foucault, he appears to validate Foucault's perspective on the social construction of the "human."[133] Healy additionally mirrors Foucault in his remarks that

> Developments [in psychopharmacology] are part of a change in our culture, and they mean that we now experience ourselves in ways that are radically different from the ways in which others experienced themselves before us… this book is not about a definition of

[132] Healy, *The Creation of Psychopharmacology*, 2.
[133] Especially in *The Order of Things: An archaeology of the human sciences*

> the human self, but it is about a set of conditions that have all but preset the terms in which any debate about the nature of self can take place.[134]

While *The Creation of Psychopharmacology* gives a substantial account of its titular subject, in the author's own words, it is less about psychopharmacology per se and more about the modern conceptual basis of "the human." His examination of the word "psyche" comports with his belief that supposedly "natural" or non-constructed dynamics of the self are, in fact, historical contingencies:

> While the word "psyche" can be traced back to the Greeks, it took on new meaning in the 1880s. In its older meaning the psyche was a soul, or something close to it, whereas the modern word refers to mnemonic capacities and sets of attributes and aptitudes that are anatomizable and quantifiable, with no reference to the moral center of the individual.[135]

Throughout *The Creation of Psychopharmacology*, Healy presents several cases which attest to the quantifiable human as both product and subject of scientific governance. Interestingly, the years after its publication in 2004 would see the rise of the "quantified self" movement.[136] Members of the "quantified self" movement practice digital self-quantification techniques in the interest of their own well-being and improvement — effectively assuming an administrative role in their own scientific governance.

---

[134] Healy, *The Creation of Psychopharmacology*, 2-3.
[135] Healy, *The Creation of Psychopharmacology*, 24.
[136] See Sun-Ha Hong, "Data's Intimacy: Machinic Sensibility and the Quantified Self," *communication +1*: Vol. 5, Article 3 (Fall 2016): 5.

The case of the Quantified Self movement exists along a historical continuum which might be said to begin in the twentieth century. Healy's parable of psychopharmacology points up a divide between nineteenth and twentieth-century frameworks for conceiving the self:

> Whereas the nineteenth-century mapping of new domains was largely qualitative (descriptive), twentieth century mapping was quantitative. The quantitative mapping of IQ and other psychological functions powerfully introduced the notion of a norm and of deviations from that norm into considerations of behavior, giving rise in the process to new concepts, such as that of a personality disorder. Whereas qualitative approaches had targeted a limited number of patients, statistical approaches to psychological tests led scientists to claim that they could extrapolate from small samples to the population at large. All of a sudden a large group of people found out that they were abnormal.[137]

The genesis of modern psy- science techniques overlaps with the formalization of psychedelic science. Shortly after LSD was paired with chlorpromazine, all manners of psychometric hermeneutics were applied to the psychedelic experience. Among the more famous of these is the "mystical experience scale" developed by Walter Pahnke in the early 1960s. Pahnke was a psychiatrist and minister whose doctoral dissertation at Harvard University included the frequently-cited "Good Friday experiment." In this study, Michael Pollan reports, "twenty divinity students received a capsule of white powder during a Good Friday service at Marsh Chapel on the Boston University campus, ten of them containing psilocybin, ten an 'active

[137] Healy, *The Creation of Psychopharmacology*, 349.

placebo.'"[138]Pahnke's aim was to determine whether psilocybin intoxication might yield a mystical or theological experience. Towards this end, Pahnke asked his subjects to fill out a follow-up questionnaire. In this survey, subjects were instructed to rate the extent to which the following criteria described their experience:

> 1. A feeling of oneness, that is, ego transcendence; 2. Noetic quality or sense of truth 3. A transcendence of time or space; 4. A feeling of sacredness; 5. Deeply felt positive mood; 6. An awareness of paradoxicality— an awareness that is anomalous in the Western scientific paradigm; 7. A feeling that the experience is ineffable; 8. Transiency; 9. Persisting positive changes in attitudes and behavior.[139]

It was determined thereafter that eight of the ten students who received psilocybin had a "powerful mystical experience," while only one in the control group did. While this metric appears to have been helpful, there is an inherent paradox in the use of quantitative frameworks to study psychedelic experience. In determining the value of phenomena which are often said to defy articulation, researchers must always make interpretative judgments.

This is especially true when such phenomena are reported as measurable variables. It remains true whether one is measuring the magnitude of mystical experience or any other dimension of psychedelic inebriation. The following reflects Sessa's thoughts on measuring the impact of psychedelics on intelligence quotient:

---

[138] Pollan, *How To Change Your Mind*, 74.

[139] Thomas B Roberts. *The psychedelic future of the mind: How entheogens are enhancing cognition, boosting intelligence, and raising values*. (Rochester, VT: Park Street Press, 2013), 94.

> It is often difficult to get meaningful data because subjects frequently become engrossed in the subjective aspects of the drug experience, and lose interest in the tasks presented by the investigators. Understandably, psychological tests are often seen as absurd or irrelevant by the subjects, illustrated well by this quote from the psychologist Arthur Kleps:
>
> If I were to give you an IQ test and during the administration one of the walls of the room opened up, giving you a vision of the blazing glories of the central galactic suns, and at the same time your childhood began to unreel before your inner eye like a three-dimension colour movie, you too would not do well on an intelligence test.[140]

Nicolas Langlitz echoes this sentiment in his article "The persistence of subjectivity in neuropsychopharmacology: observations of hallucinogen research," where he declares that "filling in questionnaires is not the same as writing detailed experience reports."[141] He explains that, in questionnaires, "it remains unclear against which experiential background subjects evaluate the extraordinariness of their drug experience."[142] Here, Langlitz gestures towards the fact that drug experience can only be thought of as "unusual" if it is understood to be relative to a "normal" state, which would be the presumptive "objective" or "control" condition. As he points out, "normal" is a subjective descriptor. The felt experience of "normal" consciousness may vary widely among individuals. Moreover, Langlitz writes, accounts from psychedelic research subjects "can be provided only in retrospect. At the time of their occurrence, singular mental

[140] Sessa, *The Psychedelic Renaissance*, 123.
[141] Nicolas Langlitz, "The persistence of subjectivity in neuropsychopharmacology: observations of hallucinogen research" *History of the Human Sciences* 23, no. 1 (2010): 42.
[142] Langlitz, "The persistence of subjectivity," 42.

events such as the emergence of a hallucination escape objectification."[143] He then offers the following quote from his mentor, the neuropsychopharmacologist Franz Vollenweider:

> It's extremely difficult to capture this inner truth or subjective reality. It can be mapped with rating scales and neuropsychological experiments, but these experimental interventions make these states collapse. There is something like Heisenberg's uncertainty principle in hallucinogen research: when you're observing the neurophysiology the experience escapes you and vice versa.[144]

The previous observations by Langlitz and Vollenweider summarily describe an essential problem for psychedelic methodology: how does one gather information on phenomena that may be fundamentally unobservable? Here, another question might be put forth: if there is a connection between idiographic qualities and psychedelic therapeutic efficacy, how might scientists produce psychedelic knowledge that is both widely applicable and medically useful?

Shulgin would offer that subjectivity can never be entirely discounted from these questions. Williams writes that, in his observational techniques, Shulgin"totally abandon[s] any idea of objectivity." Williams further qualifies the chemist's perspectives as follows:

> measurements of the drug's effect should be ideally objective but "in the case of drugs like these — psychoactive drugs — the effects can be seen only within the subject's sensorium. Only he can observe and report the degree and nature of the drug's action. Hence, the

[143] Langlitz, "The persistence of subjectivity," 42.
[144] Langlitz, "The persistence of subjectivity," 42.

> subject is the observer and objectivity in the classic sense is impossible." This raises the question of whether such experimentation has any place in science at all: since objectivity and repeatability are both impossible, according to Shulgin, and these are two of the most important principles in science.[145]

It would appear that psychedelics might prescribe a new way of doing science. The phrase "psychedelic science" would, then, not denote the same thing as a "science of psychedelics." Without a qualifier added to the term "science," the phrase "science of psychedelics" might suggest that the science of psychedelics keeps with scientific norms. As I have sought to show in this chapter, the development of psychedelic knowledge has historically been anything but usual. The patent qualities of psychedelic experience, meanwhile, are no less true in the age of the data episteme.

In the following chapter, I will more thoroughly explore "psychedelic" as a particular approach to science, and I will show that psychedelic experience demands a psychedelic science. This approach is necessary to establish psychedelic science as a verification of abstraction, negativity, and non-positivist epistemic virtues, and as such, as a challenge to the data episteme.

[145] Williams, "Human Psychedelic Research: A Historical and Sociological Analysis."

## Chapter 5: The Idiosyncratic

*A man sets out to draw the world. As the years go by, he peoples a space with images of provinces, kingdoms, mountains, bays, ships, islands, fishes, rooms, instruments, stars, horses, and individuals. A short time before he dies, he discovers that the patient labyrinth of lines traces the lineaments of his own face.*

Jorge Luis Borges, afterword to "El Hacedor/The Maker"[1]

### Introduction: Reimagining Psychedelic History

On September 12, 2019, the documentary television program "The Mind Explained" premiered an episode on the revival of psychedelic drug research in the twenty-first century.[2] Although "The Mind Explained: Psychedelics" provides abundant historical context for the psychedelic renaissance, it reinforces the questionable narrative regarding the long-term hiatus in psychedelic studies. As I wrote in the previous chapter, most scholars hold legal prohibitions entirely responsible for impeding psychedelic research after the 1960s. A small number, however, have suggested that intrinsic difficulties associated with studying psychedelic experience also contributed to the field's long-term marginalization. This group does not include Michael Pollan and Roland Griffiths, both of whom were consulted for "The Mind Explained: Psychedelics." Pollan's 2018 book *How To Change Your Mind: What the New Science of Psychedelics Teaches Us About Consciousness, Dying, Addiction, Depression, and Transcendence* is perhaps the best-known publication from the psychedelic renaissance. [3] Griffiths, a neuroscientist and

[1] Jorge Luis Borges, *Collected Fictions*, trans. Andrew Hurley. (New York: Penguin Books, 1999), 293.
[2] "The Mind, Explained: Psychedelics." Netflix Official Site, September 12, 2019. https://www.netflix.com/title/81098586.
[3] Michael Pollan, *How To Change Your Mind: What The New Science of Psychedelics Teaches Us About Consciousness, Dying, Addiction, Depression, and Transcendence*. New York, NY: Penguin Press, 2018.

psychiatrist, directs the Center for Psychedelic and Consciousness Research at Johns Hopkins University. Pollan and Griffiths both serve as consummate figureheads of the psychedelic psychiatry movement.

In separate interviews for the "The Mind Explained: Psychedelics," they provide what appear to be complete reports of the rise, fall, and resurgence of psychedelic research following the discovery of LSD. Both identify the confluence of anti-drug moral sentiment and legal prohibitions in the United States and Western Europe as the field's major adversary. Neither considers that features inherent to psychedelic phenomenology also served to inhibit its development. Their testimonies contrast with the historiography I presented in chapter four, where I claimed that the more unusual aspects of psychedelic experience have long problematized scientific inquiry. As I indicated, psychedelic effects tend to resist codification, measurement, and replication in controlled settings. Henceforth, I posed the following two questions: first, how does one gather information on an experience that may be unobservable?. Second, if there is a connection between unobservable phenomena and psychedelic therapeutic efficacy, how might researchers develop knowledge on psychedelics that is both widely applicable and medically useful?

Although my conceptualization of "psychedelic science" determines protocols for scholarship and clinical practice, the phrase fundamentally denotes a set of theoretical criteria for proof of psychedelic medical efficacy. As I have written, the qualifications for "scientificity" in the context of psychedelic medical research differ from those associated with dominant scientific epistemologies. Throughout my project, I have explored the particular epistemological commitments of psychedelic science, with a special focus on the ways in which psychedelic research processes subvert the normative operations of the data episteme. In this chapter, I

address contemporary studies which speak to the need for a "psychedelic science" as a specific mode of knowledge production and medical practice. These studies clarify the ways in which psychedelic science refutes the data episteme.

Before I investigate this body of literature, it is necessary for me to review my project's major conceptual predicates. In chapter two, I claimed that the data episteme operates by means of resemblance with and amplification of positivistic properties. I also connected the data episteme with Gilles Deleuze and Félix Guattari's theory of the image of thought, and I posited an image of thought which advances the data episteme — what I called "the data image of thought." In chapter three, I invoked Guattari's notion of the "chaoid" to indicate the existence of a "psychedelic chaoid," which signals the capacity of psychedelic experience to promote the cognitive function of negation. I wrote of a "psychedelic chaoid," or a mental activity induced by psychedelic inebriation which effectively breaks the data image of thought by resisting its program of positivistic resemblance-making. These ideas are implicit in contemporary psychedelic science literature, although, for the most part, they not been excavated and articulated as such. As a precursor to my review of the contemporary literature, I will elaborate on psychedelics as agents of abstract or negative thought.

**Psychedelics, Abstraction, and the Image of Thought**

My treatment of abstraction as a mental process aligns with Matteo Pasquinelli's reading of Deleuze and Guattari's *A Thousand Plateaus: Capitalism and Schizophrenia*. After considering abstraction as it is theorized in *A Thousand Plateaus,* Pasquinelli concludes that "there is no

ontological difference between thought and perception, abstraction and negation."[4] I wrote in chapter three that, although data may perform certain functions associated with thought or abstraction, they do not permit negation, which I defined as a mental operation which observes the unknown and unknowable. The data image of thought does not recognize that which is absolutely foreign, unequivocal, or "other." It therefore does not permit abstract thought.

In her book *Contingent Computation: Abstraction, Experience and Indeterminacy in Computational Aesthetics*, M. Beatrice Fazi explores Deleuze's research on abstraction as it relates to the notion of the image of thought. For Deleuze, she writes,

> the separation between an ontological and an epistemological plane must be dissolved in order to leave room for "a new image of the act of thought, its functioning, its genesis in thought itself." Abstract thought is a type of thinking that does not belong to somebody; it is unbounded, immediate, and indeterminate. This means, against the representational character of Descartes's *cogito* and Kant's faculty of reasoning, that Deleuze's abstract thought is already positioned when one emerges as a subject of that thought, and that this subject cannot be identified as the source of such positioning… Suggestively, Deleuze affirmed that "the theory of thought is like painting: it needs that revolution which took art from representation to abstraction."[5]

[4] Matteo Pasquinelli, "The Power of Abstraction and Its Antagonism: On Some Problems Common to Contemporary Neuroscience and the Theory of Cognitive Capitalism," in *The Psychopathologies of Cognitive Capitalism: Part Two*, ed. Warren Neidich. (Berlin, Germany: Archive Books, 2014), 7.
[5] M. Beatrice Fazi, *Contingent Computation: Abstraction, Experience and Indeterminacy in Computational Aesthetics* (London: Rowman & Littlefield, 2018), 34-35.

As Fazi makes clear, Deleuze's "abstract thought" cannot be said to belong to a thinking subject. This is because the subject is always identified with an image, and abstract thought is something other than that which is presupposed as the image of thought. Deleuze's abstract thought is not only disidentified with a subject, but avoids all forms of identification with recognizable or pre-existing images. Meanwhile, the data episteme operates by representing or extending identifiable properties. Digital data affix to and amplify what is already known (or, per the word's etymological origins, what is already given).[6] Thus the data episteme forecloses Deleuze's would-be revolution in the theory of thought. From a Deleuzean perspective, the data episteme is hostile towards the very act of thinking.

In his essay "Gilles Deleuze and Psychedelic Thought as Resistance," philosopher Oli Genn Bash argues that psychedelic experience refutes the image of thought. As he writes, psychedelic experience "escape[s] the presupposition of being supported by an Image which inclines towards the truth," and thus disaffirms any theory of thought as denotative representation.[7] From there, Bash argues that psychedelic experience fosters skepticism towards such presuppositions, and supports a theory of thought as abstraction.

To remain consistent with Deleuze and Guattari's conceptualization of the image of thought, Bash refers only to first-hand encounters with psychedelic substances. He does not draw from anecdotal trip reports, published research, or other second-hand sources of information. This is because, as he notes, the image of thought denies the existence of such secondary or transcendent viewpoints. In his words,

---

[6] Alexander R. Galloway, "From Data to Information." September 22, 2015. http://cultureandcommunication.org/galloway/from-data-to-information.

[7] Oli Genn Bash, "Gilles Deleuze and Psychedelic Thought as Resistance" in *Neurotransmissions: Essays on Psychedelics From Breaking Convention*, ed. Dave King. (London: Strange Attractor Press, 2015), 27.

> There is a difficulty in analysing the psychedelic experience in general as a "psychedelic experience" might contain many different aspects, or mean various things to different people. In this instance, I do not necessarily see any merit in exploring other subjective viewpoints regarding the psychedelic experience, as there is the very likely possibility of just falling into the trap of a psychedelic image which others have created. This would not really allow for an exploration into psychedelic thought as resistance to the Image of Thought, as we would merely be viewing this resistance in a confined manner which is exactly the opposite of what Deleuze is putting forward.[8]

Despite Bash's intentions, "Gilles Deleuze and Psychedelic Thought as Resistance" does not escape "the trap of a psychedelic image." In the above passage, he implies that it may be illegitimate to assay any psychedelic experience for signs of generalizable features. Nevertheless, he uses a hypothetical scenario to exemplify general features of LSD inebriation. This imaginary presents an individual in the midst of an LSD trip who encounters a wooden table and becomes "solely concerned with exploring the patterns in the grains of the wood."[9] Bash writes that this person "could be exploring the shape of the table and the patterns for hours before even noticing that it is a 'table.'"[10] In other words, the individual does not perceive a table as such, instead fixating on details which are not determined or informed by the categorical *a priori* of "the table." Insofar as *a priori* categories might be said to comprise an image of thought, this imaginary illustrates the LSD experience as a meaningful deviation from the image of thought. I

[8] Bash, "Gilles Deleuze and Psychedelic Thought as Resistance," 29-30.
[9] Bash, "Gilles Deleuze and Psychedelic Thought as Resistance," 29-30.
[10] Bash, "Gilles Deleuze and Psychedelic Thought as Resistance," 29-30.

would add that non-categorical thought is also a negative mental operation. As an act of thinking which does not depend upon pre-existing conceptual foundations, non-categorical thought unfolds beyond the ambit of that which is already known or given as an *a priori*. Stated differently, non-categorical thinking negates the known. When non-categorical thinking is induced by psychedelic ingestion, it reflects the presence of the psychedelic chaoid.

Although it serves a clear analytic purpose, the hypothetical scenario recounted above undermines Bash's self-declared methodological principles. This is because it constructs a viewpoint which is meant to be treated as distinct from the author's lived experience. In spite of his promise to refer only to first-hand experience, Bash still presents a second-hand source, or a source whose perspective is not his own. He appears to have run up against the paradox confronted by empirical psychedelic researchers who are obliged by convention to refer to multiple external sources in their scholarship. These obligations apply no less to scholars who acknowledge the potential for positivistic representation to violate subjective characteristics of psychedelic experience. In the previous chapter, I documented the long history of this paradox, which begins with Humphry Davy's eighteenth-century research on nitrous oxide. It has become all the more pronounced in the era of digital and data-intensive hermeneutics, as data are by definition always positive and manifest, and such hermeneutics promote positivistic epistemic criteria.

This paradox has received some attention from today's psychedelic scholars.[11] As noted in chapter four, historian Matthew Oram has claimed that the twentieth-century trend towards scientized protocols in psychopharmaceutical research contributed to the suspension of psychedelic inquiry after the 1960s. He writes that certain FDA regulations which date to the

[11] Including Neşe Devenot, Nicolas Langlitz, and Ben Sessa, among others.

early 1960s problematized efforts to establish the efficacy of psychedelic medicine. These policies, he notes, reinforced the post-Enlightenment epistemological bias towards quantitative and positivistic mechanisms of proof for epistemic validation. Oram's research speaks to the need for a bespoke "psychedelic science" as opposed to a normative "science of psychedelics" which would fully comply with epistemological norms. Because it substantiates the irreconcilability of psychedelic science and the data episteme, his work deserves further examination.

**From "Drug Efficacy" to "Experience Efficacy:" Legitimating Psychedelic Medicine**

In his article "Efficacy and Enlightenment: LSD Psychotherapy and the Drug Amendments of 1962," Oram compares the history of psychedelic studies in the United States with that of amphetamines, a category of nervous system stimulants which includes the prescription drug Adderall and the illicit methamphetamine, among many other substances. Oram indicates that psychedelics and amphetamines were both subject to the United States' Comprehensive Drug Abuse Prevention and Control Act of 1970, which imposed stringent regulations on pharmaceutical research.[12] While this legislation had a chilling effect on psychedelic studies, it did little to hinder the medical development of amphetamines.

Here, Oram recounts the events leading up to the enactment of Comprehensive Drug Abuse Prevention and Control Act:

> LSD's criminalization did not prohibit research and, until 1970, permission to conduct clinical research with LSD was obtained through the same process as any other drug.

[12] Matthew Oram, "Efficacy and Enlightenment: LSD Psychotherapy and the Drug Amendments of 1962." Journal of the History of Medicine and Allied Science 69, no. 2 (August 2012): 223.

> Additionally, many drugs, such as morphine, maintained dual lives as illegal street drugs, and valuable and legitimate tools of medicine. Indeed, a similar public, medical, and political outcry over the dangers of medical and non-medical abuse of amphetamines occurred concurrent with the LSD controversies of the mid to late 1960s. Amphetamine abuse was a target of the same prohibiting legislation as LSD, yet the drug retained a legitimate medical use.[13]

Central to this story is the classification schema of drug "schedules" introduced as part of the Comprehensive Drug Abuse Prevention and Control Act. The legislation's five schedules rank various substances based on their accredited medical use and level of safety. Psychedelic substances were placed in Schedule I, which indicates no medical applicability and highest potential for harm, and imposes the most rigorous regulations .[14]Amphetamines, meanwhile, were divided between the more permissive Schedules II and III.[15] Pharmaceutical firms were therefore at greater liberty to develop amphetamine-based as opposed to psychedelic medical products.

Oram attests that the divergent scheduling of psychedelics and amphetamines did not reflect any measure of these substances' risk or medical value, but was instead determined by industry interests. At the time of the Controlled Substances Act, he writes, amphetamine compounds were highly successful as both prescription and over-the-counter medications. Psychedelics, on the other hand, had yet to prove their commercial viability as pharmaceuticals. To make this point, Oram cites Nicolas Rasmussen, who studies the social history of

[13] Oram, "Efficacy and Enlightenment," 223.
[14] Drugs.com, "CSA Schedules."
[15] Drugs.com, "CSA Schedules."

amphetamines. In his article "America's First Amphetamine Epidemic, 1929-1971," Rasmussen writes that drug scheduling decisions were subject to industry influence. As he explains,

> The 1970 Comprehensive Drug Abuse Prevention and Control Act established the modern set of controlled substance "schedules" in harmony with new international agreements and enabled federal narcotics authorities to establish and enforce production quotas on drugs in the most strictly controlled Schedules I and II. However, reflecting industry interests, only a handful of rarely prescribed injectable methamphetamine products were placed in Schedule II, while some 6000 oral amphetamine products on the US drug market were classed in Schedule III, meaning they were subject to no manufacturing quotas and to looser recordkeeping and their prescriptions could be refilled 5 times.[16]

By Oram's account, psychedelics could never achieve amphetamines' level of market success. This is because their medical applicability could not be established in accordance with the Kefauver-Harris Drug Amendments of 1962, which, as noted in chapter four, brought forth new criteria for proof of safety and efficacy in the wake of the thalidomide crisis of the 1950s.[17] Oram writes that these policies emphasized "the need for large patient populations and sophisticated statistical analysis to determine the significance of results."[18] He proceeds to comment on the procedural difficulties that these requirements posed to psychedelic studies:

---

[16] Nicolas Rasmussen, "America's First Amphetamine Epidemic, 1929-1971"
[17] Katherine Hendy, "Placebo Problems: Boundary Work in the Psychedelic Science Renaissance." *Plant Medicines, Healing and Psychedelic Science*, 2018: 155.
[18] Oram, "Efficacy and Enlightenment," 224

> This technique theoretically allowed the objective assessment of drugs, as all extrapharmacological factors that could influence the outcome of a treatment were equally present in the experimental and control groups. Therefore, any statistically significant difference in the results between the groups could only be due to the drug. However, this method was not well suited to test all treatments, particularly those that utilized psychological elements, and it carried with it the assumption that drug therapies worked through a direct biological action.[19]

As I have noted throughout my project, scholarly consensus holds that psychedelic psychiatry does not work exclusively through what Oram calls "direct biological action." Psychedelic research trials may only be able to prove efficacy if their standards of proof account for the influence of non-chemical factors on subject outcomes. Such factors might include subjects' psychological condition, the physical environment of treatments, and the effects of adjacent therapies, among many possible others.

Psychedelic psychiatrists have echoed Oram's perspectives on the poor match between psychedelic qualia and the regulations on methodology stipulated by the Kefauver-Harris amendments. They claim that psychedelic research must acknowledge the many differences between the psychotherapeutic operations of psychedelic drugs and those of more conventional psychopharmaceutical treatment, especially including the importance of extrapharmacological factors to the treatment process. Among these factors, the role of psychotherapy might be said to be the most significant. Although psychedelic psychiatry is still in its infancy, it seems unlikely that any model of practice will emerge which does not include some form of psychological

[19] Oram, "Efficacy and Enlightenment," 224

counseling.[20] The role of psychotherapy is so essential, in fact, that psychiatrist Eduardo Schenberg refers to psychedelic psychiatry as "psychedelic-assisted psychotherapy," or "PAP." Schenberg remarks that PAP "can be conceptualized as the induction of an experience with positive long-term mental health consequences, rather than daily neurochemical corrections in brain dysfunctions," heralding a key difference between the healing mechanisms of psychedelics and those of the most well-known psychopharmaceuticals, such as antidepressant and antipsychotic medications.[21]

In "Psychedelic-Assisted Psychotherapy: A Paradigm Shift in Psychiatric Research and Development," Schenberg describes PAP as a watershed break with psychiatric norms. Specifically, it "suggests a conceptual expansion of 'drug efficacy' to 'experience efficacy,'" which should influence the criteria for proof of medical value. [22] The distinction between drug efficacy and experience efficacy comports with Oram's perspectives on the unique methodological requirements of psychedelic trials. It also follows the distinction I have made between a "science of psychedelics" and a "psychedelic science." Whereas a normative science of psychedelics might primarily investigate the effects of psychedelics on the brain, psychedelic science would give special attention to factors external to these substances' neurophysiological effects. Psychedelic scientists would relatedly recognize that pharmacological and extrapharmacological variables cannot be datafied in exactly the same way. The former category more swiftly accommodates discretization and quantification, while the latter is at greater risk of being misconstructed by such techniques. It is not so much that psychedelic science would

[20] See, for example, Janis Phelps, "Developing Competencies and Guidelines for the Training of Psychedelic Therapists," and Rick Doblin, "The Future of Psychedelic-Assisted Psychotherapy"
[21] Schenberg, "Psychedelic-Assisted Psychotherapy: A Paradigm Shift in Psychiatric Research and Development"
[22]Schenberg "Psychedelic-Assisted Psychotherapy: A Paradigm Shift in Psychiatric Research and Development"

entirely avoid rendering its subject matter as digital data, but that such practices would have to be implemented with a reflexive awareness of its limitations.

In his article "The Persistence of Subjectivity In Neuropsychopharmacology: Observations of Contemporary Hallucinogen Research," Nicolas Langlitz explores the role of subject-reported testimonies in the field of neuropsychopharmacology through the lens of digital psychedelic research. Specifically, he examines the use of encephalograms and neuroimaging techniques in studies which document the impact of psychedelic inebriation on the human brain.[23] Such investigations, he writes, attempt to identify empirical markers for the subjective effects of psychedelics, or what is known in the field of neuroscience as "neural correlates" for altered states of consciousness. Langliz claims that the aforementioned digital tools need to be supplemented by first-hand reports from the research subjects. "Otherwise," he writes, "it would be impossible to tell what the measured neural correlates were correlates of."[24] He also believes that psychedelic scientists benefit from having had experiences with the drugs themselves, as such personal familiarity would allow researchers to evaluate neural correlates of psychedelic effects from the perspective of direct experience — a perspective which, he suggests, may not bear in second-hand sources. As he explains,

> In the quest for neural correlates of (drug-induced altered states of) consciousness, introspective accounts of test subjects play a crucial role in neuroimaging studies. Firsthand knowledge of the drugs' flamboyant effects provides researchers with a personal knowledge not communicated in scientific publications, but key to the conduct

[23] Nicolas Langlitz, The Persistence of the Subjective in Neuropsychopharmacology: Observations of Contemporary Hallucinogen Research." *History of the Human Sciences* 23, no. 1 (2010): 38.
[24] Langlitz, "The Persistence of the Subjective," 43.

> of their experiments. In many cases, the "psychedelic experience" draws scientists into the field and continues to inspire their self-image and way of life.[25]

To be sure, the arguments Langlitz makes in "The Persistence of Subjectivity" extend to research initiatives which are not specifically concerned with psychedelic compounds. "The Persistence of Subjectivity" uses psychedelic science as a means to corroborate the inexorable role of subjectivity across the field of neuropsychopharmacology as a whole. It is significant, however, that among all possible case studies, Langlitz takes psychedelic research as his point of entry into the dependence of neuropsychopharmacology on the authority of subjective information from research volunteers and scientists' own lived experience with psychedelic compounds. It would appear that psychedelic scholars are unusually willing to work beyond the traditional object-subject dynamic, wherein the input of the research subject is always mediated by the hermeneutic work of the scientist, who represents objectivity and epistemic validity.

There is precedent for reflexive approaches to psychedelic methodology beyond the scope of studies which rely on digital measurement tools. In chapter three, I addressed the use of interpretative phenomenological analysis, or IPA, in psychedelic analyses. IPA, which was originally developed for qualitative psychology research, requires investigators to explicitly acknowledge the fact that their viewpoint is partial and biased. The authority of the researcher is not considered absolute, but is balanced by the authority of the subject under study. Interpretative phenomenological analysis also maintains that psychological knowledge is processual and open-ended rather than stable or finite.

[25] Langlitz, "The Persistence of the Subjective," 37.

IPA is epistemically aligned with the burgeoning initiative to allow psychedelic researchers and clinicians to openly draw upon knowledge gained from first-hand psychedelic use. This movement might be described as a radical affirmation of the role of non-empirical information in psychedelic medical practice. As a means by which to prioritize both the subjective aspects and incommunicable nature of psychedelic phenomena, this radical affirmation embodies the principles of "psychedelic science" as opposed to a "science of psychedelics." In the following section, I will contend that it affirms forms of knowledge which resist datafication.

**Psychedelic Savoir-faire Meets the Ecstasy of Communication**

To be sure, certain aspects of first-hand psychedelic use may very well be expressed as digital data. Verbal reports can be rendered digitally, as can artistic works reflecting the lived experience of a hallucinogenic trip.[26] However, in light of so many claims to the ineffability and personal significance of psychedelic experience, it would seem that these substances impart upon their users a certain *savoir-faire* and *savoir-vivre.* I use these terms in accordance with the definitions provided in chapter two, where I refer to Bernard Stiegler's book *For A New Critique of Political Economy*. To briefly recapitulate, *savoir-faire* entails a certain savvy, finesse, or incommunicable "know-how."[27] *Savoir-vivre* describes the related faculty of "how to live," which comes from the practice of living, and cannot be grasped through language alone. *Savoir-faire* and *savoir-vivre* are epistemic faculties which can only be obtained through direct experience. They cannot be learned and practiced by secondhand means, as in reading books,

[26] See, for example, the artwork and statements published by Alex and Allyson Grey at www.cosm.org.
[27] Bernard Stiegler, *For A New Critique of Political Economy*, (Cambridge: Polity, 2013), 30.

receiving instruction in educational settings, or utilizing digital applications. As I wrote in chapter two, Stiegler in fact maintains that the use of digital tools effects "a vast process of the loss" of *savoir-faire* and *savoir-vivre*.[28]

The likelihood that psychedelic scientists might one day be allowed to deploy knowledge gained from first-hand psychedelic use — what might be called psychedelic *savoir-faire* — seems remote. So far, this technique is purely speculative, perhaps because there exist clear ethical injunctions against it. Its advocates, however, claim that the potential benefits of this technique are too high for it to remain uninvestigated. In their article "The Influence of Therapists' First-Hand Experience With Psychedelics on Psychedelic-Assisted Psychotherapy Research and Therapist Training," psychiatrists Elizabeth M. Nielson and Jeffrey Guss attempt "to open an academic dialogue on the role of researchers' and clinicians' personal experience with psychedelic compounds... by asking what may be the impact of this experience on therapeutic outcomes."[29] The article has a clear polemic function, as it proposes that "this should now be an askable and researchable question," and that that this question should "be moved from theoretical debate to a subject of formal inquiry."[30]

Nielson and Guss clarify that first-hand experience does not constitute a valid source of information in pharmaceutical research. They maintain their position nevertheless. As they write,

> we can confidently state that variation in therapists' personal experience with LSD and

[28] Stiegler, *For a New Critique of Political Economy*, 30.
[29] Elizabeth M. Nielson and Jeffrey Guss, "The Influence of Therapists' First-Hand Experience with Psychedelics on Psychedelic-Assisted Psychotherapy Research and Therapist Training." *Journal of Psychedelic Studies* 2 (2): 4. https://doi.org/10.1556/2054.2018.009
[30] Nielson and Guss, "The Influence of Therapists' First-Hand Experience with Psychedelics" 4.

> psilocybin introduces a potential confound to research efforts to demonstrate the efficacy of psychedelic therapy in a rigorous way. The nature of this confound is, in fact, an unaddressed empirical question: no contemporary studies have systematically studied whether or how therapists' first-hand experience with psychedelics affects clinical outcomes in psychedelic therapy… Even though it is methodologically quite complicated, empirical exploration of these questions is vital, and that question is rendered outside the scope of inquiry if academic psychedelic research remains wholly embedded in the epistemology of objective psychopharmacologic research.[31]

Here, Nielson and Guss highlight the fact that "objective psychopharmacologic research" does not recognize the epistemic import of *savoir-faire*. The incorporation of psychedelic *savoir-faire* and *savoir-vivre* would challenge this precept. Insofar as the existence of these faculties cannot be empirically proven, such an official inclusion would deviate from positivist approaches to psychedelic knowledge production.

The relationship between first-hand psychedelic experience and normative epistemologies is also a concern for anthropologist Beatriz Labate and public health researcher Kenneth Tupper. Their article "Ayahuasca, Psychedelic Studies and Health Sciences: The Politics of Knowledge and Inquiry into an Amazonian Plant Brew" examines personal experience as an esteemed source of information in the ritual use of the hallucinogenic brew ayahuasca by Amazonian indigenous groups.[32] They suggest that psychedelic scientists may similarly benefit from self-experimentation, and describe the initiative to officially permit this

[31] Nielson and Guss, "The Influence of Therapists' First-Hand Experience With Psychedelics," 4.
[32] Beatriz C. Labate and Kenneth Tupper, "Ayahuasca, Psychedelic Studies and Health Sciences: The Politics of Knowledge and Inquiry into an Amazonian Plant Brew." *Current Drug Abuse Reviews* 7, no. 2 (2015): 71–80.

strategy as a grassroots scholarly effort to construct epistemic norms which better fit their research. "Despite the political and cultural forces operating to discourage it," they write, "some psychedelic researchers not only admit to having experiences with the substances they study, but even suggest that to do so is epistemically desirable."[33]

Like Nielson and Guss, Labate and Tupper identify the virtue of objectivity as problematic for this movement. In "Ayahuasca, Psychedelic Studies and Health Science," they emphasize that the presumptive scientific authority of the "objective fact" is a product of technological developments which followed the Enlightenment. The nineteenth century, they claim, saw the rise of "novel mechanical devices in experiment and observation" after which "the personal idiosyncrasies of the human researcher could be overcome through the mediation of external instruments and the assiduous self-effacement of the scientist."[34] In other words, technological mediation made it possible to factor the scientist out of the science, so to speak. The ethic of objectivity which Labate and Tupper describe holds that "personal idiosyncrasies" and other possible disruptions to the seamless transmission of fact may be warded off by proper device use.

The campaign for the incorporation of first-hand knowledge in psychedelic science corroborates the importance of *savoir-faire* to the field. Because *savoir-faire* determines an expressly individualistic practice of sensemaking, it circumvents the homogenizing function of datafication. *Savoir-faire* would act as a shield against what Jean Baudrillard calls "the ecstasy of communication," or the uninhibited flow of communication facilitated by technological media. Baudrillard contends that the ecstasy of communication — which is the subject of an

[33] Labate and Tupper, "Ayahuasca, Psychedelic Studies and Health Sciences," 77.
[34] Labate and Tupper, "Ayahuasca, Psychedelic Studies and Health Sciences," 77.

eponymously-titled book — permits no communicative depth or signification. All that it mediates is the media form itself, much in the sense described by media theorist Marshall McLuhan in his seminal essay "The Medium Is The Message."[35]

Baudrillard writes that the ecstasy of communication denudes all information of profundity, distance, or illusion, and is therefore "obscene." As he explains,

> Obscenity begins when there is no more spectacle, no more stage, no more theatre, no more illusion, when every-thing becomes immediately transparent, visible, exposed in the raw and inexorable light of information and communication. We no longer partake of the drama of alienation, but are in the ecstasy of communication. And this ecstasy is obscene. Obscene is that which eliminates the gaze, the image and the representation.[36]

That which cannot be expressed positively constitutes a barrier to the ecstasy of communication. This incommunicable element, however, is prone to be violated by the ecstasy of communication, which promotes the objective virtues of transparency and totality. If psychedelic scholars were to invoke phenomena which fundamentally resist expression as informants to their work, they would, in effect, contribute to the deceleration of the ecstasy of communication. This alternative mode of scientific practice is not a pellucid transfer of knowledge. It instead implies a reflexive recognition of the constructed nature of knowledge, much like the stage upholds the fictional constructs of theater.

---

[35] Marshall McLuhan. *Understanding Media: the Extensions of Man*. (Cambridge, MA: MIT Press, 1997), 7-21.

[36] Jean Baudrillard, *The Ecstasy of Communication*. Trans. Bernard and Caroline Schute. (New York: Semiotext(e), 1988), 21-22.

The ecstasy of communication is undiscriminating and ruthless in its program of revelation. Baudrillard writes that it generates a "pornography of information," or a lurid and overwrought mass of communicative material. As he puts it,

> Today there is a pornography of information and communication, a pornography of circuits and networks, of functions and objects in their legibility, availability, regulation, forced signification, capacity to perform, connection, polyvalence, their free expression… it is no longer the obscenity of the hidden, the repressed, the obscure, but that of the visible, the all-too-visible, the more-visible-than-visible; it is the obscenity of that which no longer contains a secret and is entirely soluble in information and communication.[37]

Pornography is that which is "entirely soluble in information and communication." Insofar as the data episteme subjects all phenomena to intelligible expression, it always yields a certain informational pornography. Stated differently, digital data always produce an ecstasy of communication.

As detailed in chapters one and two, data serve the same function as capital. To briefly recapitulate, data and capital are both media of equivocation. Digitization and commodification processes render objects ontologically in the sense that they refigure them in accordance with standard forms of data and financial currency. It is therefore not coincidental that Baudrillard connects the "obscenity" of communicative media with Karl Marx's writings on the obscenity of the commodity form. According to Baudrillard, "the obscenity of the commodity" had "already

[37] Baudrillard, *The Ecstasy of Communication*, 22-23.

been denounced" in Marx's work.[38] He adds that the Marxist notion of the commodity form is structurally supportive of the ecstasy of communication, as commodities depend on the principles of equivalence and free circulation. In Baudrillard's words,

> The commodity is legible, as opposed to the object, which never quite reveals its secret, and it manifests its visible essence — its price. It is the locus of transcription of all possible objects: through it, objects communicate — the merchant form is the first great medium of the modern world. But the message which the objects deliver is radically simplified and is always the same — their exchange value.[39]

As Baudrillard demonstrates, the principle of exchange value renders all commodities fungible, that is, modular and fully interchangeable. In chapters one and two, I demonstrated that units of data are also modular and fungible. And because data can only self-replicate, digital exchange only resolves in more data. The ecstatic transfer of data thus unfolds as a proliferation of sameness.

Byung-Chul Han makes a similar claim in his book *The Transparency Society*, which describes the social effects of unrestricted commodity exchange. The principle of exchange, he writes, makes societies "transparent."[40] As he puts it, "things prove transparent when they abandon singularity and find expression through their price alone."[41] Han holds that the acceleration of capitalism has led to the rise of a "transparency society," insofar as economic

[38] Baudrillard, *The Ecstasy of Communication*, 22-23.
[39] Baudrillard, *The Ecstasy of Communication*, 22-23.
[40] Byung-Chul Han, *The Transparency Society*, trans. by the Board of Trustees of the Leland Stanford Junior University. (Stanford, CA: Stanford University Press, 2015), 1.
[41] Han, *The Transparency Society*, 2.

value "makes it possible to equate anything with anything else, [and] abolishes all incommensurability, any singularity." For this reason, the society of transparency is "an inferno of the same."[42] Han's "inferno of the same" conceptualizes the same phenomenon as Baudrillard's "ecstasy of communication." The data episteme attempts to make this phenomenon total by rendering all objects soluble in communication. This process excludes that which cannot be figured as discrete, atomizable, and fungible — stated differently, that which does not resemble itself. That is, it systematically denies uniqueness.

Deleuze has also observed the loss of the unique under conditions of increasing technologization. In his 1992 essay "Postscript on the Societies of Control," he reflects on the deterioration of "the individual" amidst the accelerating technological profusion of information. "Individuals have become 'dividuals,'" he claims, or figures whose distinctive characteristics are occluded by technologically-mediated information. He writes that dividuals might be defined as"masses, samples, data, markets, or 'banks.'" [43] They are informational replicas stripped of all quirks and irregularities.

The conceptual opposite of the "dividual" is not "the individual," but rather "the idiot." In *Psychopolitics: Neoliberalism and New Technologies of Power,* Han describes the idiot as a storied figure in the history of philosophical thought. The idiot, he writes, dates to Ancient Greece. In Han's view, Socrates —"who knows only that he does not know" — is an archetypal "idiot." Rene Descartes, who "thinks by thinking Thought (*das Denken denkt*)," also counts as an idiot. Han claims that the Cartesian formula *cogito ergo sum* is "idiotic," as it "takes an inner contraction of thinking to make a new beginning."[44] But Han is primarily interested in Deleuze

[42] Han,*The Transparency Society*, 2.
[43] Gilles Deleuze, "Postscript on the Societies of Control." *October* 59 (1992), 5.
[44] Han, *Psychopolitics*, 81-82.

and Guattari's treatment of "the idiot," which appears to exist "in opposition" to the Cartesian idiot. He quotes directly from Deleuze and Guattari's book *What is Philosophy?*, where they describe this new sort of idiot:

> the old idiot wanted indubitable truths at which he could arrive by himself: in the meantime he would doubt everything … The new idiot has no wish for indubitable truths; he… wills the absurd — this is not the same image of thought. The old idiot wanted truth, but the new idiot wants to turn the absurd into the highest power of thought.[45]

Han writes that Deleuze and Guattari's "idiot," and perhaps all other idiotisms, are on the verge of extinction. "Thoroughgoing digital networking and communication have massively amplified the compulsion to conform," he attests. "The attendant violence of consensus is suppressing idiotism."[46]

Digital networking does not acknowledge any division between society and "the individual," or the singular figure whose mind might have at one time been metonymized with an image of thought. The digital suppression of idiotism violates the interiority of the mind or psyche as much as it does society. The suppression of idiotism is both psychical and political — it is psychopolitical.

Data "dividuals" are produced by the psychopolitical suppression of the unique or irregular. The idiot, on the other hand, is categorically singular. Han writes of the idiot's "idiosyncrasy," which "literally refers to a specific and peculiar mixture of the body's humours

[45] Deleuze and Guattari, "What is Philosophy?," qtd. in Han *Psychopolitics*, 81.
[46] Han, *Psychopolitics*, 82.

and the oversensitivity this entails."[47] He explains that idiosyncrasy obstructs the homogenizing processes of datafication. "When communication is to be accelerated," he writes, "idiosyncrasy poses an obstacle inasmuch as it amounts to an immunological defence against the Other."[48]

In my project, what is crucial about the idea of the "subjective" as it is deployed by psychedelic scientists in fact has little to do with the concept of subjectivity as it is normally understood. Rather, "the subjective" bears epistemic value as a sort of cipher for the idiosyncratic-idiot in the context of psychedelic science. By its very definition, the idiosyncratic can only be approximated or articulated in oblique terms. That which Langlitz, Labate, Tupper, Nielson and Guss invoke with the terms "subjective" and "subjectivity" would more accurately be considered the idiosyncratic acting in the capacity of informant to psychedelic science, where it assists scholarly investigations into the therapeutic mechanisms of psychedelic substances. The "subjective" of psychedelic science gestures towards the element which, although indescribable and non-positivistic, is still critical to the aims of research and practice.

On principle, "the idiosyncratic" has no special relationship with "the subject" or "subjectivity." This is especially crucial considering that the concepts of "the subject" and "subjectivity" substantiate the epistemological and ontological validity of "the object," whereas the idiosyncratic does not exist in relation to any object at all. The idiosyncratic posits epistemic and ontic features which do not rest upon any preexisting determining or independent factor. It is unique in the most literal sense, or *sui generis*.

It is possible to speak of the digitization of subjectivity in the sense that digitization is capable of creating subjects and subjectivity. In fact, it might be said that when the idiosyncratic

[47] Han, *Psychopolitics*, 82.
[48] Han *Psychopolitics*, 82.

assumes a digital form, it becomes a subject of the data episteme. In his book *The Burnout Society*, Han uses the language of immunology to illustrate the way in which positive phenomena, including data assemblages, subsume the idiosyncratic, or what he calls "the Other." When the Other comes into contact with positive phenomena — which he calls "the Own" — it seeks to introduce negativity into the Own's positive territory. But the Own cannot be structurally negated, and thus, in turn, it "negates the negativity," or that which is singular about the Other. Han describes this function as follows:

> The immunologically Other is the negative that intrudes into the Own [*das Eigene*] and seeks to negate it. The Own founders on the negativity of the Other when it proves incapable of negation in turn. That is, the immunological self-assertion of the Own proceeds as the negation of negation. The Own asserts itself in—and against—the Other by negating its negativity. Immunological prophylaxis, that is, inoculation, follows the dialectic of negativity. Fragments of the Other are introduced into the Own in order to provoke an immunoreaction. Thereby, negation of negation occurs without the danger of death, because the immune system does not confront the Other itself.[49]

When the idiosyncratic, or "immunologically Other," encounters the positive Own, it does not maintain its singularity. It rather becomes subject to expression, or the "negation of negation." It becomes a subject to the positive object. Here, I am using the concept of "the subject" not as a semantic approximation of the idiosyncratic — that is, not in the same sense that psychedelic scientists conceive of "subjectivity" — but in keeping with its more conventional usage, where

[49] Byung-Chul Han, *The Burnout Society*, trans. by the Board of Trustees of the Leland Stanford Junior University. (Stanford, CA: Stanford University Press, 2015), 1.

it is understood as always relative to an object. Insofar as the data episteme yields subjects, it is not subjects which subvert the data episteme.

I have described the target of psychedelic science as subjective experience. In the psychedelic science literature, "the idiosyncratic" is often indicated through recollections of subjective experience, including first-hand psychedelic substance use. But the target of psychedelic inquiry is more properly understood as "the idiosyncratic." In the context of psychedelic science, "the idiosyncratic" entails an awareness of fundamental uniqueness or alterity which may be leveraged towards therapeutic practices. This knowledge, which cannot withstand the digital ecstasy of communication, is consecrated in the methodological operations of psychedelic science. In closing, this chapter will examine the idiosyncratic as the object of psychedelic inquiry and as a meaningful confound to the data episteme.

**The Idiosyncratic**

Han's figure of "the idiot" is not necessarily constituted by a single person, consciousness or intelligence. Per Deleuze's theory of abstract thought, the idiot— or "he who wills the absurd," as opposed to an image of thought — should not be identified with any such figure, as this figure is always preceded by an image of thought. The idiot may be defined simply as a validation of idiosyncrasy. Under the digital epistemic regime, the idiosyncratic is that which cannot be networked, mediated, or — ultimately — observed. Han's "idiot," as he writes, "escapes communication and networking altogether."[50] As such, the idiot testifies to the existence of the idiosyncratic.

[50] Han, *Psychopolitics*, 83-84.

I cannot positively express the ways in which psychedelic scientists might observe the unobservable-idiosyncratic, except through the sort of first-hand encounter which normative scientific procedure does not permit. As it is, however, the existence of the unobservable is not contingent upon witness. What the idiosyncratic requires instead is acknowledgement. Psychedelic scientists are thus tasked to enlighten their field to the possibility that phenomena which resist observation are not only epistemologically valid, but necessary.

Han writes that the idiot "does not 'communicate.'"[51] At least, he does not communicate in the sense that communication heralds exchange with another communicating body. The idiot instead "communicates with the incommunicable," as Han claims, and in so doing, "takes leave of the prevailing system" and "abandons intelligence."[52] Psychedelic science, meanwhile, is not a science of "intelligence" in the sense that intelligence is contingent upon epistemic criteria for legitimation. With no preset criteria for proof of efficacy, psychedelic science may not so much constitute a "science" as a practice of art. It perhaps only becomes a science by virtue of its implementation in medical practice. This is, to be sure, the capacity in which it faces the data episteme.

The coming years will in all likelihood see an expansion in psychedelic drug research.[53] But they will probably not see the retraction of the data episteme. The epistemic problems I have outlined may very well manifest themselves across various instances of theoretical and empirical psychedelic research programs. These problems should not disqualify psychedelic science, but rather speak to its capacity to indicate the hazards of overdetermined epistemic principles.

[51] Han, *Psychopolitics*, 83-84.
[52] Han, *Psychopolitics*, 83-84.
[53] See, for example, Rick Doblin et al.: "The Past and Future of Psychedelic Science," 2019.

I have not stated that psychedelic science provides the only challenge to the data episteme, but rather that the critique it permits is uniquely salient. I will suggest that any other critique of the data episteme would have to acknowledge the role of the unobservable in practices of knowledge production. Such a critique, in other words, would defend and promote the virtue of the idiosyncratic.

## Epilogue: "If It Doesn't Exist on the Internet…"

The World Economic Forum reports that in the year 2020, the global quantity of data is expected to reach forty-four zettabytes, or $1{,}000^7$ bytes.[1] This amount is forty times greater than the number of stars in the known universe.[2] Meanwhile, the two wealthiest individuals on the planet serve as chief executive officers for corporations who traffic in digital data. At the time of writing, Jeff Bezos, CEO of Amazon.com, Inc., holds a net worth of approximately 118 billion dollars.[3] He is succeeded by Bill Gates, CEO of the Microsoft Corporation, whose net worth is valued at 108 billion dollars.[4] While Amazon.com sells material goods, its could not exist without the networked digital infrastructure which permits its rapid and global exchange of goods and services, and which also serves as one of its most profitable wares.[5] Microsoft, on the other hand, was among the first corporations to benefit from the marginal input cost of digital production. By patenting and selling its flagship product — the Microsoft Windows operating system — at a cost that is much higher than that of the total inputs required to produce each copy, Microsoft prototyped a model of production fully distinct from that described by Karl Marx.[6]

To revisit the summation provided in chapter three, Marx's economic analysis posits a dependent and directly causal relationship between human labor and material components, which

---

[1] Jeff Desjardins,""How Much Data Is Generated Each Day?" https://www.weforum.org/agenda/2019/04/how-much-data-is-generated-each-day-cf4bddf29f/. Accessed February 1, 2020.
[2] Desjardins, "How Much Data Is Generated Each Day?"
[3] "Jeff Bezos." Forbes. Forbes Magazine. Accessed March 3, 2020. https://www.forbes.com/profile/jeff-bezos/#3fa38731b238
[4] "Bill Gates." Forbes. Forbes Magazine. Accessed March 3, 2020. https://www.forbes.com/profile/bill-gates/#3b3c9a4e689f
[5] Nathan Reiff. "How Amazon Makes Money: Cloud Services Soar." Investopedia. Investopedia, February 5, 2020. https://www.investopedia.com/how-amazon-makes-money-4587523.
[6] "Microsoft Founded." History.com. A&E Television Networks, October 9, 2015. https://www.history.com/this-day-in-history/microsoft-founded.

resolves in the price of a good or service.[7] Because human labor and material resources are finite, so too is economic value. By denying intellectual authority to non-digital objects, the data episteme supports the dominance of a form of economic which, much in contrast with Marx, theoretically permits the infinite accumulation of capital — that is, Baudrillard's sign value form.[8] The data episteme facilitates the economic hegemony of the sign value form by naturalizing the possibility that all phenomena, including the most arcane depths of human consciousness, may be rendered digital. If the recent acceleration of both digital data and wealth borne by digital rentiers serve as any proof, it would appear that the data episteme has made significant steps towards this totalizing goal.

As contemporary scholars attempt to grasp the social, economic, and epistemic implications of Big Data, some have turned to the historical canon of technology research John Cheney-Lippold opens his 2017 book *We Are Data: Algorithms and the Making of Our Digital Selves* by declaring that today's networked citizens are "'well-filled with data.'"[9] This is a nod to the influential media theorist Marshall McLuhan, who in 1964 coined the term "high definition" to describe technological media which are "well-filled with data," or rich with information.[10]

*We Are Data* describes the human digital condition in comprehensive detail. Cheney-Lippold tells the reader that, if they do not believe themselves to be "well-filled with data," they should "roam the web for five minutes." In those five minutes, he claims,

[7] See Tucker, ed., *The Marx-Engels Reader,* 304.
[8] See Jean Baudrillard, *For A Critique of the Political Economy of the Sign*.
[9] John Cheney-Lippold, *We Are Data: Algorithms and the Making of Our Digital Selves*. (New York, NY: NYU Press, 2017), 3.
[10] Marshall McLuhan, *Understanding Media: The Extensions of Ma*n (Cambridge, MA: MIT Press), 22.

> you will have generated, through your web activity, an identity that is likely separate from the person you thought you were. In a database far, far away, you have been assigned a gender, ethnicity, class, education level, and potentially the status of parent with x number of children. Maybe you were labeled a U.S. citizen or a foreigner. There's even a slight chance you were identified as a terrorist by the U.S. National Security Agency.[11]

In this passage, Cheney-Lippold implies that there is something sinister about the production of personal data by digital networks. His remarks align with Sun-Ha Hong's theorization of "data's intimacy," or the idea that data "may come to know us better than we know ourselves."[12] Hong and Cheney-Lippold both reflect fears of alienation and estrangement by digital technology. If data are gaining epistemic authority over human life, or if our identity in a database is "separate" from the person that we think we are, the potential for self-determination would appear to be under siege.

It is possible, however, that the person we think we are is not very different from the identity generated by our online activities. Cheney-Lippold names "gender, ethnicity, class, education level, and potentially the status of parent with x number of children" as pre-established groups into which one might be algorithmically sorted.[13] These categories are not "separate" from human life as it is normally understood. Gender, ethnicity, class, and parental status are universally recognized as personal attributes. And, although few might identify with the normative and politically-coded label of "terrorist," it is at least true that "terrorism" entails

---

[11] Cheney-Lippold, *We Are Data*, 3.
[12] Sun-Ha Hong, "Data's Intimacy: Machinic Sensibility and the Quantified Self," *communication +1*: Vol. 5, Article 3 (Fall 2016), 2.
[13] Cheney-Lippold, *We Are Data*, 3.

activities which one might very well consider to be central to one's identity. Who, then, does Cheney-Lippold believe that we think we are?

Throughout my project, I have shown that data are impervious to formal boundaries and categorical divisions. Data do not recognize any difference between persons and the features which define their digital selves. These features, however, are not utterly foreign. Across a multitude of digital applications, users willingly identify themselves with markers which define their interests, professional endeavors, and personal relationships. If these technologies provoke feelings of estrangement or powerlessness, it is not because they yield unrecognizable versions of ourselves. The sense of separation described by Cheney-Lippold, and the epistemic threat posited by Hong, may instead be connected to the fact that data do not bear the element of the idiosyncratic.

The wager of psychedelic science is that the idiosyncratic plays a role in psychological health. As I wrote in chapter five, psychedelic scientists face the task of affirming the idiosyncratic in their practice, despite the fact that it is not considered to be a legitimate source of scientific knowledge by the terms of normative scientific epistemologies. The idiosyncratic also distinguishes individuals from what Gilles Deleuze calls "dividuals," or human beings wrought as "masses, samples, data, markets or 'banks.'"[14] Deleuzean dividuals are "well-filled with data" or "high definition" in the sense first conceptualized by McLuhan. The idiosyncratic exists beyond the ambit of "dividual" life.

Michel Foucault provides what is perhaps the most salient account of the idiosyncratic in the age of data. In the preface to *The Order of Things: An Archaeology of the Human Sciences*, Foucault claims that the text was inspired by the essay "The Analytical Language of John

[14] Gilles Deleuze, "Postscript on the Societies of Control." *October* 59 (1992), 5.

Wilkins" by fiction writer Jorge Luis Borges.[15] Foucault writes that this essay contains a passage which quotes a certain "Chinese encyclopaedia." In this encyclopedia, he continues,

> it is written that "animals are divided into: (a) belonging to the Emperor, (b) embalmed, (c) tame, (d) sucking pigs, (e) sirens, (f) fabulous, (g) stray dogs, (h) included in the present classification, (i) frenzied, (j) innumerable, (k) drawn with a very fine camelhair brush, (l) *et cetera*, (m) having just broken the water pitcher, (n) that from a long way off look like flies."[16]

Foucault then points out that the taxonomy is riven with internal contradictions, and as such, rests on unstable epistemological grounds. "The thing we apprehend in one great leap," he writes, "the thing that, by means of the fable, is demonstrated as the exotic charm of another system of thought, is the limitation of our own, the stark impossibility of thinking *that*." [17] In other words, the list of animals presents a way of thinking that challenges all notions of logical coherence.

Foucault proceeds to explain the list's major paradox:

> The monstrous quality that runs through Borges's enumeration consists…in the fact that the common ground on which such meetings are possible has itself been destroyed. What is impossible is not the propinquity of the things listed, but the very site on which their propinquity would be possible. The animals "(i) frenzied, (j) innumerable, (k) drawn with

[15] Jorge Luis Borges, *Other Inquisitions: 1937-1952* (Austin, TX: University of Texas Press), 103.
[16] Michel Foucault, *The Order of Things: An Archaeology of the Human Sciences* (London: Routledge, 2002), xvi.
[17] Foucault, *The Order of Things,* xvi.

> a very fine camelhair brush" — where could they ever meet, except in the immaterial sound of the voice pronouncing their enumeration, or on the page transcribing it? Where else could they be juxtaposed except in the non-place of language? Yet, though language can spread them before us, it can do so only in an unthinkable space.[18]

What is problematic, in other words, is that the animals can no longer "meet" one another, because the word "meet" denotes an assembly between multiple distinct entities. However, as Foucault observes, the taxonomy denies the possibility of any such distinction. It instead undermines the logic by which such divisions are, in fact, genuinely distinct.

This problem, surely, is due to the fact that the list's constitutive categories overlap with and encompass one another. It is entirely possible, for example, for an animal to simultaneously "belong to the Emperor" and "be drawn with a very fine camelhair brush." The taxonomy thus appears to violate its own internal logic. It also nullifies any distinction between intrinsic and extrinsic properties, where "extrinsic properties" describe the relationship of the animal to its broader category. For example, the words "et cetera," which means "miscellaneous," and "innumerable," which might be rephrased as "infinite" or "indefinite," both evoke the nonspecific. No animal is intrinsically "et cetera," and a group of animals can only be considered "innumerable" as relative to an external measure or standard. Thus the terms "et cetera" and "innumerable" reflexively refer to the relationship between the animals and the list which envelops them. On the other hand, the features indicated by the words "frenzied" and "embalmed" are inherent to animals themselves. An animal may be embalmed even if the condition of being "embalmed" serves no categorical purpose.

[18] Foucault, *The Order of Things,* xviii.

The categories listed above are ontologically separate at the most fundamental level. Nevertheless, the Chinese encyclopedia renders them equivalent by making them perform the same taxonomical function. Foucault writes that one category in particular exemplifies this contradiction. As he writes,

> The central category of animals "included in the present classification," with its explicit reference to paradoxes we are familiar with, is indication enough that we shall never succeed in defining a stable relation of contained to container between each of these categories and that which includes them all: if all the animals divided up here can be placed without exception in one of the divisions of this list, then aren't all the other divisions to be found in that one division too? And then again, in what space would that single, inclusive division have *its* existence? Absurdity destroys the *and* of the enumeration by making impossible the *in* where the things enumerated would be divided up.[19]

Here, Foucault emphasizes that all animals qualify as "contained within the present classification" so long as they are placed there. Meanwhile, there are no barriers to entry, insofar as the label "contained within the present classification" only refers to itself. Because it does not describe any particular or intrinsic qualities of the entities it might contain, all potential inhabitants may in fact be classified as "within the present classification." Perhaps they do not even have to be animals.

[19] Foucault, *The Order of Things, xviii.*

The purpose of a taxonomy is to mark a system of distinctions between phenomena which share a common feature, as in a botanical taxonomy which identifies distinct species of the plant kingdom. The Borgesian taxonomy is "monstrous" because it destroys the ground for any such distinctions. In a way, it operates much like Jean Baudrillard's ecstasy of communication, or Byung-Chul Han's inferno of the same. As I wrote in chapter five, this is also the signature function of digitization. Upon entering the category of "data," objects become ontologically akin to all other digital phenomena.

The inferno of the same is "monstrous" in theory. It does not, however, exist in practice. In his essay "If It Doesn't Exist on the Internet, It Doesn't Exist," the poet Kenneth Goldsmith claims that he used to make the titular observation "hyperbolically," as something of a cynical joke.[20] "But as time has gone on," he continues, "it's proved to be a truism, perhaps the paradigmatic truism of our times."[21] For this reason, he writes, he was inspired to develop the website UbuWeb, which archives avant-garde poetry and visual art. UbuWeb's mission is to ensure the existence of obscure cultural artifacts even after their analog counterparts have long vanished.[22]

Goldsmith acknowledges that he uses the word "existence" in a very limited sense. "By exist," he writes, "I mean something exists when it can be shared, altered and re-circulated."[23] His "existence," in other words, is wholly positive. It comports with a worldview which only recognizes that which can be externally verified, as in Auguste Comte's original formulation of positivism.[24] Goldsmith is aware that the general concept of "existence" supersedes the capacity

---

[20] Kenneth Goldsmith. "If It Doesn't Exist on the Internet, It Doesn't Exist." https://www.poetryfoundation.org/harriet/2007/03/if-it-doesnt-exist-on-the-internet-it-doesnt-exist
[21] Goldsmith, "If It Doesn't Exist on the Internet, It Doesn't Exist."
[22] See www.ubuweb.com.
[23] Goldsmith, "If It Doesn't Exist on the Internet, It Doesn't Exist."
[24] Auguste Comte, *A General View of Positivism*. (Cambridge: Cambridge University Press, 1848), 26.

to be shared, altered, and circulated. "If It Doesn't Exist on the Internet" redefines "existence" as "existence on the Internet," which in turn denies the existence of all offline phenomena. Thus Goldsmith not only signals the marginalization of the offline world, but also suggests that non-networked spaces are alterior in the literal sense of having no existence at all. As he writes, "the new radicalism is paper. Publish it on a printed page and no one will ever know about it."[25] He additionally tells the reader that if they do not want something to exist — because, as he says, "there are many reasons to want to keep things private" — that they should "keep it off the web."[26] The essay concludes on this pithy word of advice.

The data episteme will become total when all non-digital phenomena cease to have any epistemic significance — that is, when they cease to exist as informants to knowledge. This event, to be sure, will not come to pass in practice. As a theoretical possibility, however, it represents the terminus of the epistemic problems presented by Big Data. As I wrote in chapter one, Alan Liu has warned about an imminent epistemic horizon, or a situation wherein the hierarchical measures conventionally used to validate knowledge disintegrate in the wake of digital epistemic acceleration.[27] These measures constitute Foucault's "common ground," or the site which renders possible the thinking of genuine difference and alterity. Bodies of knowledge lose their points of distinction when they are perpetually open to digital epistemic permeation.

Foucault likens the common ground that has been lost to a "famous 'operating table.'"[28] This is a reference to the novel *The Songs of Maldoror* (*Les Chants de Maldoror*) by the Comte de Lautréamont, which is considered an early prototype of surrealist literature. In *The Songs of*

[25] Goldsmith, "If It Doesn't Exist on the Internet, It Doesn't Exist."
[26] Goldsmith, "If It Doesn't Exist on the Internet, It Doesn't Exist."
[27] Alan Liu, "Theses on the Epistemology of the Digital: Advice for the Centre for Digital Studies," 2014
[28] Foucault, T*he Order of Things*, xviii

*Maldoror,* Lautréamont writes of a young boy who is "as beautiful as the chance meeting on a dissecting-table of a sewing-machine and an umbrella."[29] This line describes the assembly of two objects which bear no obvious relation to one another in a context that is unrelated to either one. In likening the lost common ground to Lautréamont's operating table, Foucault points to the fact that the operating table serves as the category or container which permits the "*and"* of the enumeration. The table provides the basis for a conceptual link between two different objects. This link in turn accentuates the difference between the two. The unique character of the sewing machine is thrown into high relief by its juxtaposition with the umbrella and the table upon which both rest.

It is not possible to express the logic which links the sewing machine to the umbrella. This is because there is no logic to be found. The scene is meant to be absurd. The operating table introduces a connection which is unintelligible and inscrutable to all measures of thought. Perhaps this is why Lautréamont's narrator describes the chance meeting as "beautiful."

The operating table plays the part of Deleuze and Guattari's idiosyncratic idiot, or he who "wills the absurd."[30] I have suggested that the therapeutic mechanisms of psychedelics also advance a sort of thought which defies positive logic. Psychedelics might be said to function like the fabled operating table. Certainly, the sewing machine cannot meet the umbrella in the space of data, or the inferno of the same. The task for those who would seek alternatives is to recognize what is not the inferno, make it endure, and give it space.

---

[29] Comte de Lautréamont, *Maldoror & the Complete Works of the Comte De Lautréamont* (Cambridge, MA: Exact Change, 2011), 193.
[30] Gilles Deleuze and Félix Guattari, "What is Philosophy?," qtd. in Han *Psychopolitics*, 81.

**Bibliography**


Austin, Paul. “An Introduction To The History Of LSD.” The Third Wave, October 13, 2015. https://thethirdwave.co/lsd-history/.

Author unknown. “Grof, Dr Stanislav." Accessed August 17 2018. https://allaboutheaven.org/sources/669/147/grof-dr-stanislav.

Adorno, Theodor. *Negative Dialectics*, trans. The Continuum Publishing Company. New York, NY: The Continuum Publishing Company, 1973.

Anderson, Chris. “The End of Theory: The Data Deluge Makes the Scientific Method Obsolete.” Wired. Conde Nast, June 26, 2008. https://www.wired.com/2008/06/pb-theory/.

Baudrillard, Jean. *For a critique of the political economy of the sign*. Translated by Charles Levin. USA (no city/state given): Telos Press, 1981.

Baudrillard, Jean. *The Ecstasy of Communication.* Translated by Bernard and Caroline Schute. New York: Semiotext(e), 1988.

Baudrillard, Jean. *Simulacra and Simulation.* Translated by Sheila Faria Glaser. Ann Arbor: University of Michigan Press, 2018.

Bash, Oli Genn. “Gilles Deleuze and Psychedelic Thought as Resistance.” In *Neurotransmissions: Essays on Psychedelics From Breaking Convention*, edited by Dave King 25–33. London: Strange Attractor Press, 2015.

Belser, Alexander B., Gabrielle Agin-Liebes, T. Cody Swift, Sara Terrana, Neşe Devenot, Harris L. Friedman, Jeffrey Guss, Anthony Bossis, and Stephen Ross. “Patient Experiences of Psilocybin-Assisted Psychotherapy: An Interpretative Phenomenological Analysis.” *Journal of Humanistic Psychology* 57, no. 4 (2017): 354–88. https://doi.org/10.1177/0022167817706884.

Berardi, Franco ‘Bifo.’ *The Soul At Work: From Alienation to Autonomy.* Cambridge, MA: Semiotext(e), 2009.

Berardi, Franco ‘Bifo.’ “The Mind’s We: Morphogenesis and the Chaosmic Spasm Social Recomposition, Technological Change and Neuroplasticity.” In *The Psychopathologies of Cognitive Capitalism: Part One*, Edited by Arne de Boever and Warren Neidich. Berlin, Germany: Archive Books, 2013.

Borges, Jorge Luis, *Collected Fictions*. Translated by Andrew Hurley. New York: Penguin Books, 1999.

Borges, Jorge Luis. *Other Inquisitions: 1937-1952*. Translated by Ruth L.C. Simms. Austin, TX: University of Texas Press, 2002.

Bowker, Geoffrey. “The Theory/Data Thing: Commentary.” *International Journal of Communication* 8 (2014): 1795-1799.

Brown, Ethan. “Professor X.” Wired. Conde Nast. Accessed April 18, 2018. https://www.wired.com/2002/09/professorx/

Calvino, Italo. *Invisible Cities*. Translated by William Weaver. Orlando, FL: Harcourt, 2006.

Cheney-Lippold, John. *We are data: Algorithms and the making of our digital selves*. New York, NY: New York University Press, 2017.

Chun, Wendy Hui Kyong. “On ‘Sourcery," or Code as Fetish.” *Configurations* 16, no. 3 (2008): 299–324. https://doi.org/10.1353/con.0.0064.

Comte, Auguste. *A General View of Positivism*. Cambridge, England: Cambridge University Press, 1848.

Collins, Harry M. “The Meaning of Data: Open and Closed Evidential Cultures in the Search for Gravitational Waves.” *American Journal of Sociology* 104, no. 2 (1998): 293–338. https://doi.org/10.1086/210040.

Chapel of Sacred Mirrors, “CosM.” Accessed January 22, 2020. https://www.cosm.org/.

Crawford, Kate, Kate Miltner, and Mary L. Gray. “Critiquing Big Data: Politics, Ethics, Epistemology. Special Section Introduction.” *International Journal of Communication* 8 (2014): 1663-1672.

Crocq, Marc-Antoine. Historical and Cultural Aspects of Man's Relationship with Addictive Drugs. *Dialogues in clinical neuroscience*, *9*(4), 2007, 355–361.

Dalton, Craig M, Linnet Taylor, and Jim Thatcher. “Critical Data Studies: A Dialog on Data and Space.” *Big Data & Society* 3, no. 1 (May 2016): 205395171664834. https://doi.org/10.1177/2053951716648346.

De Bolla, Peter. “Digital Knowledge: Format, Scale, and the Information-knowledge Parallax at the Total Knowledge Horizon — A Reply to Alan Liu.” Last updated 15 November 2014. http://liu.english.ucsb.edu/peter-de-bolla-reply-to-alan-lius-theses-on-the-epistemology-of-the-digital/

Debord, Guy. *La Société du Spectacle*. Translated by Donald Nicholson Smith. New York, NY: Zone Books, 1967.

Deleuze, Gilles. "Postscript on the Societies of Control." *October* 59 (1992): 3-7.

Deleuze, Gilles and Félix Guattari. *What is Philosophy?*. Translated by Hugh Tomlinson and Graham Burchell. New York, NY: Columbia University Press, 1994.

Derrida, Jacques. *Of Grammatology*. Translated by Gayatri Chakravorty Spivak. Baltimore, MD: Johns Hopkins University Press, 1976.

Descartes, René. *Discourse on Method and Meditations on First Philosophy*. Translated by Donald A Cress. Indianapolis, IN: Hackett Publishing Company, 1998.

Desjardins, Jeff. "How Much Data Is Generated Each Day?" World Economic Forum. Accessed January 26, 2020. https://www.weforum.org/agenda/2019/04/how-much-data-is-generated-each-day-cf4bddf29f/.

Devenot, Neşe. "Altered States/Other Worlds: Romanticism, Nitrous Oxide and the Literary Prehistory of Psychedelia." PhD diss. University of Pennsylvania, 2015.

Devenot, Neşe. (2017). "The Role of Poetic Language in Psychedelic Science Research." Poster presentation at MAPS Psychedelic Science Conference.

Doblin, Rick. "Pahnke's 'Good Friday Experiment' — A Long Term Follow-Up And Methodological Critique." *The Journal of Transpersonal Psychology*, Vol. 23, No. 1, 1991: 1-28.

Doblin, Rick. "Regulation of the Medical Use of Psychedelics and Marijuana." PhD diss. Harvard University, 2001.

Doblin, Rick, Merete Christiansen, Lisa Jerome, and Brad Burge. "The Past and Future of Psychedelic Science: An Introduction to This Issue." *Journal of Psychoactive Drugs* 51, no. 2 (2019): 93–97. https://doi.org/10.1080/02791072.2019.1606472.

Doblin, Rick. "The Future of Psychedelic-Assisted Psychotherapy." TED. Accessed January 22, 2020. https://www.ted.com/talks/rick_doblin_the_future_of_psychedelic_assisted_psychotherapy.

Domingos, Pedro. "A Few Useful Things to Know about Machine Learning." *Communications of the ACM* 55, no. 10 (January 2012): 78-87. https://doi.org/10.1145/2347736.2347755.

Doyle, Richard. *Darwin's pharmacy: Sex, plants, and the evolution of the noösphere*. Seattle, WA: University of Washington Press, 2011.

Drugs.com, "CSA Schedules." Accessed November 30, 2019. Last modified May 18, 2018. https://www.drugs.com/csa-schedule.html

Family, Neiloufar, David Vinson, Gabriella Vigliocco, Mendel Kaelen, Mark Bolstridge, David J. Nutt, and Robin L. Carhart-Harris. "Semantic Activation in LSD: Evidence from Picture Naming." *Language, Cognition and Neuroscience* 31, no. 10 (November 2016): 1320–27. https://doi.org/10.1080/23273798.2016.1217030.

Fazi, M. Beatrice. *Contingent Computation: Abstraction, Experience and Indeterminacy in Computational Aesthetics*. London: Rowman & Littlefield, 2018.

Foucault, Michel. *The Order of Things: An Archaeology of the Human Sciences*. London: Routledge, 1970.

Foucault, Michel. *Discipline and Punish: The Birth of the Prison*. Translated by Alan Sheridan. New York, NY: Random House, 1977.

Foucault, Michel. *Power/Knowledge: Selected Interviews and Other Writings 1972-77*. Edited by Colin Gordon. Translated by Colin Gordon, Leo Marshall, John Mepham, and Kate Sopher. New York, NY: Pantheon Books, 1980.

Foucault, Michel. *Psychiatric Power: Lectures at the Collège de France*, 1973-1974. Translated by Graham Burchell. New York, NY: Palgrave-McMillan, 2003.

Foucault, Michel. *On The Government of the Living: Lectures at the Collège de France, 1979-1980*. Translated by Graham Burchell. Basingstoke, UK: Palgrave-Macmillan, 2012.

Forbes. "Bill Gates." Forbes Magazine. Accessed March 3, 2020. https://www.forbes.com/profile/bill-gates/#3b3c9a4e689f.

Forbes. "Jeff Bezos." Forbes Magazine. Accessed March 3, 2020. https://www.forbes.com/profile/jeff-bezos/#3fa38731b238.

Frisby, David. "The Popper-Adorno Controversy: the Methodological Dispute in German Sociology." *Philosophy of the Social Sciences* 2, no. 1 (1972): 105–19. https://doi.org/10.1177/004839317200200108.

Fuchs, Christian. "From digital positivism and administrative big data analytics toward critical digital and social media research!" *European Journal of Communication* 2017, Vol. 32, no. 1 (2017): 37-49. https://doi.org/10.1177/0267323116682804.

Galloway, Alexander. "From Data to Information." Accessed January 22, 2020. Last modified September 22, 2015. http://cultureandcommunication.org/galloway/from-data-to-information.

Galloway, Alexander; Thacker, Eugene; and Wark, McKenzie. *Excommunication: Three Inquiries in Media and Mediation*. Chicago and London: The University of Chicago Press, 2013.

Galloway, Alexander, and Jason R. Larivière. "Compression in Philosophy." *Boundary 2* 44, no. 1 (May 2017): 125–47. https://doi.org/10.1215/01903659-3725905.

Goldsmith, Kenneth. "If It Doesn't Exist on the Internet, It Doesn't Exist." Poetry Foundation. Accessed January 26, 2020. https://www.poetryfoundation.org/harriet/2007/03/if-it-doesnt-exist-on-the-internet-it-doesnt-exist.

Halliday, Josh. "Infographic: Just How Much Data Exists in the Digital Universe?" The Guardian. Guardian News and Media, August 2, 2010. https://www.theguardian.com/media/pda/2010/aug/02/infographic-data-cloud.

Han, Byung-Chul. *The Burnout Society*. Translated by the Board of Trustees of the Leland Stanford Junior University. Stanford, CA: Stanford University Press, 2015.

Han, Byung-Chul. *The Transparency Society*. Translated by the Board of Trustees of the Leland Stanford Junior University. Stanford, CA: Stanford University Press, 2015.

Han, Byung-Chul. *Psychopolitics: Neoliberalism and New Technologies of Power*. Translated by Erik Butler. Brooklyn, NY: Verso, 2017.

Hartogsohn, Ido. "Constructing Drug Effects: A History of Set and Setting." Drug Science, Policy and Law 3 (January 2017): 205032451668332. doi:10.1177/2050324516683325.

Healy, David. *The Creation of Psychopharmacology*. Cambridge, MA: Harvard University Press, 2002.

Hendy, Katherine. "Placebo Problems: Boundary Work in the Psychedelic Science Renaissance." *Plant Medicines, Healing and Psychedelic Science*, 2018, 151–166. https://doi.org/10.1007/978-3-319-76720-8_9.

History.com, "Microsoft Founded," A&E Television Networks. Last modified October 9, 2015. https://www.history.com/this-day-in-history/microsoft-founded.

History.com. "MK-Ultra," last modified August 21 2018. https://www.history.com/topics/us-government/history-of-mk-ultra#section_2.

Hoffman, Albert. *LSD MY Problem Child: Reflections On Sacred Drugs, Mysticism and Science.* Santa Cruz, CA: Multidisciplinary Association for Psychedelic Studies, 2005.

Holmes, Richard. *The Age of Wonder: How the Romantic Generation Discovered the Beauty and Terror of Science*. New York, NU: Pantheon Books/Vintage Books, 2010.

Homer, *The Odyssey*. Translated by Robert Fagles. New York, NY: Penguin Putnam, 1996.

Hong, Sun-Ha. "Data's Intimacy: Machinic Sensibility and the Quantified Self," *communication +1*: Vol. 5, Article 3 (Fall 2016): 1-36. https:///doi.org/10.7275/R5CF9N15

Kember, Sarah, and Joanna Zylinska. *Life After New Media: Mediation As A Vital Process*. Cambridge, MA: The MIT Press, 2012.

Kitchin, Rob. "Big Data, New Epistemologies and Paradigm Shifts." *Big Data & Society* 1, no. 1 (2014): 205395171452848. https://doi.org/10.1177/2053951714528481.

Kitchin, Rob, and Tracey P. Lauriault. "Toward Critical Data Studies: Charting and Unpacking Data Assemblages and their Work" *Thinking Big Data in Geography*, (July 2014), 3–20. https://doi.org/10.2307/j.ctt21h4z6m.6.

Kritikos, P.G. and S.P. Papadaki, trans. George Michalopoulus, “The History of the Poppy and of Opium and Their Expansion in Antiquity in The Eastern Mediterranean Area.” *Journal of The Archaeological Society of Athens,* 1967, 17-38.

Kroker, Arthur, & Weinstein, Michael A. *Data trash: The Theory of the Virtual Class*. Montreal: New World Perspectives, 1994.

Langlitz, Nicolas. “The Persistence of the Subjective in Neuropsychopharmacology: Observations of Contemporary Hallucinogen Research.” *History of the Human Sciences* 23, no. 1 (2010): 37–57. https://doi.org/10.1177/0952695109352413.

Langlitz, Nicolas. “Is There A Place For Psychedelics In Philosophy?” *Common Knowledge* 22, no. 3 (2016): 373–84. https://doi.org/10.1215/0961754x-3622224.

Lautréamont ... de. *Maldoror & the Complete Works of the Comte De Lautréamont*. Translated by Alexis Lykiard. Cambridge, MA: Exact Change, 2011.

Lilly, John Cunningham. *Programming and Metaprogramming in the Human Biocomputer: Theory and Experiments*. Portland, OR: Coincidence Control Publishing, 2014.

Liu, Alan. “Theses on the Epistemology of the Digital: Advice For the Cambridge Centre for Digital Knowledge.” Last updated August 14, 2014. https://liu.english.ucsb.edu/theses-on-the-epistemology-of-the-digital-page/

Mackenzie, Adrian. *Machine Learners: The Archaeology of A Data Practice*, London, Cambridge, MA, The MIT Press, 2017.

Martínez, Antonio García. “No, Data Is Not the New Oil.” Wired. Conde Nast, February 25, 2019. https://www.wired.com/story/no-data-is-not-the-new-oil/.

McLuhan, Marshall. *Understanding Media: the Extensions of Man*. Cambridge, MA: MIT Press, 1997.

*Merriam-Webster Dictionary, s.v.* “digital,” https://www.merriam-webster.com/dictionary/digital.

*Merriam-Webster Dictionary, s.v.* “methodology,” https://www.merriam-webster.com/dictionary/methodology.

*Merriam-Webster Dictionary, s.v.* “unique,” https://www.merriam-webster.com/dictionary/unique.

Moulier Boutang, Yann. *Cognitive Capitalism*. Cambridge, UK: Polity Press, 2011.

Multidisciplinary Association for Psychedelic Studies. “Too Big for a Nobel Prize: Remembering Sasha Shulgin.” Accessed January 28, 2020. https://maps.org/news/383-bulletin-winter-2014/5433-too-big-for-a-nobel-prize-remembering-sasha-shulgin.

National Institute on Drug Abuse. “Common Hallucinogens and Dissociative Drugs.” NIDA. Accessed January 29, 2020.
https://www.drugabuse.gov/publications/research-reports/hallucinogens-dissociative-drugs/what-are-dissociative-drugs.

Netflix, “The Mind, Explained: Psychedelics.” Netflix Official Site, September 12, 2019. https://www.netflix.com/title/81098586.

Nielson, Elizabeth M., and Guss, Jeffrey. 2018. “The Influence of Therapists’ First-Hand Experience with Psychedelics on Psychedelic-Assisted Psychotherapy Research and Therapist Training.” *Journal of Psychedelic Studies* 2 (2): 64–73. https://doi.org/10.1556/2054.2018.009.

Oram, Matthew. “Efficacy and Enlightenment: LSD Psychotherapy and the Drug Amendments of 1962.” *Journal of the History of Medicine and Allied Science,* Volume 69, Number 2, 221-250. doi:10.1093/jhmas/jrs050

Pasquinelli, Matteo. “Italian *Operaismo* and the Information Machine.” *Theory, Culture & Society* 32, no. 3 (February 2014): 49–68. https://doi.org/10.1177/0263276413514117.

Pasquinelli, Matteo. (2014). “The Power of Abstraction and Its Antagonism: On Some Problems Common to Contemporary Neuroscience and the Theory of Cognitive Capitalism.” In *The Psychopathologies of Cognitive Capitalism: Part Two,* Edited by Warren Neidich. Berlin, Germany: Archive Books.

Pasquinelli, Matteo. “Machines That Morph Logic: Neural Networks and the Distorted Automation of Intelligence As Statistical Inference." *Glass Bead*, 2017. Accessed July 5 2018. http://www.glass-bead.org/article/machines-that-morph-logic/?lang=enview.

Passie, Torsten. “Contemporary Psychedelic Therapy: An Overview.” In Winkelman, Michael James, and Thomas B. Roberts. *Psychedelic Medicine: New Evidence for Hallucinogenic Substances as Treatment*. Westport (Conn.): Greenwood, 2007, pp. 45-68.

Petrov, Christo. “16 Big Data Statistics - The Information We Generate [2020].” Tech Jury. Tech Jury, February 18, 2020. https://techjury.net/stats-about/big-data-statistics/#gref.

Phelps, Janis. “Developing Guidelines and Competencies for the Training of Psychedelic Therapists.” Journal of Humanistic Psychology 57, no. 5 (2017): 450-87.

Polanyi, Karl. *The Great Transformation: The Political and Economic Origins of Our Time*. Beacon Press. Boston, MA: Beacon Press, 1944.

Pollan, Michael. *How To Change Your Mind: What The New Science of Psychedelics Teaches Us About Consciousness, Dying, Addiction, Depression, and Transcendence*. New York, NY: Penguin Press, 2018.

Rasmussen, Nicolas. “America’s First Amphetamine Epidemic 1929-1971: A Quantitative and Qualitative Retrospective with Implications for the Present.” *American Journal of Public Health* Vol. 98, No. 6 (June 2008) 974-985. doi:10.2105/AJPH.2007.110593.

Reiff, Nathan. “How Amazon Makes Money: Cloud Services Soar.” Investopedia. Investopedia, February 5, 2020. https://www.investopedia.com/how-amazon-makes-money-4587523.

Roberts, Thomas B. *The Psychedelic Future of the Mind: How Entheogens are Enhancing Cognition, Boosting intelligence, and Raising Values*. Rochester, VT: Park Street Press, 2013.

Rose, Nikolas. *Inventing Our Selves: Psychology, Power and Personhood.* Cambridge, UK: Cambridge University Press, 1998.

Rouvroy, Antoinette.“The Digital Regime of Truth: From the Algorithmic Governmentality to a New Rule of Law.” Translated by Anaïs Nony and Benoît Dillet. *La Deleuziana, Online Journal of Philosophy*, no. 3 (2016).

Sessa, Ben. *The Psychedelic Renaissance: Reassessing The Role Of Psychedelic Drugs in 21st Century Psychiatry and Society*. London, Muswell Hill Press, 2012.

Schenberg, Eduardo Ekman, Maria Angélica De Castro Comis, João Felipe Morel Alexandre, Luís Fernando Tófoli, Bruno Daniel Rasmussen Chaves, and Dartiu Xavier Da Silveira. “A Phenomenological Analysis of the Subjective Experience Elicited by Ibogaine in the Context of a Drug Dependence Treatment.” Journal of Psychedelic Studies 1, no. 2 (2017): 74–83. https://doi.org/10.1556/2054.01.2017.007.

Schenberg, Eduardo Ekman. “Psychedelic-Assisted Psychotherapy: A Paradigm Shift in Psychiatric Research and Development.” *Frontiers in Psychopharmacology 9* (July 5, 2018). doi:10.3389/fphar.2018.733.

Scott, Gregory, and Robin L Carhart-Harris. “Psychedelics as a Treatment for Disorders of Consciousness.” *Neuroscience of Consciousness* 2019, no. 1 (January 2019). https://doi.org/10.1093/nc/niz003.

Stiegler, Bernard. *For A New Critique Of Political Economy*. Malden, MA: Polity Press, 2012.

Symons, John, and Ramón Alvarado. “Can We Trust Big Data? Applying Philosophy of Science to Software.” *Big Data & Society* 3, no. 2 (February 2016): 1-17. https://doi.org/10.1177/2053951716664747.

Thacker, Eugene. *The Global Genome: Biotechnology, Politics, and Culture*. Cambridge, MA: MIT Press, 2005.

“The World's Most Valuable Resource Is No Longer Oil, but Data.” The Economist. The Economist Newspaper. Accessed March 3, 2020. https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data.

Tinnell, John. “Grammatization: Bernard Stiegler’s Theory of Writing and Technology.” *Computers and Composition* 37 (2015): 132–46. https://doi.org/10.1016/j.compcom.2015.06.011.

“Too Big for a Nobel Prize: Remembering Sasha Shulgin.” MAPS. Accessed January 28, 2020. https://maps.org/news-letters/v24n3/v24n3_p46-49.pdf.

Tucker, Robert C, ed. *The Marx-Engels Reader*. New York, NY: Norton, 1978.

Tupper, Kenneth, and Beatriz Labate. “Ayahuasca, Psychedelic Studies and Health Sciences: The Politics of Knowledge and Inquiry into an Amazonian Plant Brew.” *Current Drug Abuse Reviews* 7, no. 2 (2015): 71–80. https://doi.org/10.2174/1874473708666150107155042.

Turton, Stoll, David J. Nutt, and Robin L. Carhart-Harris. “A Qualitative Report on the Subjective Experience of Intravenous Psilocybin Administered in an FMRI Environment.” *Current Drug Abuse Reviews* 7, no. 2 (2015): 117–27. https://doi.org/10.2174/1874473708666150107120930.

Uricchio, William. “Data, Culture, and the Ambivalence of Algorithms.” In *The Datafied Society: Studying Culture Through Data*. edited by Mirko Tobias Schäfer and Karin Van Es. Amsterdam, Netherlands: Amsterdam University Press, 2017

Vee, Annette. C*oding Literacy: How Computer Programming Is Changing Writing.* Cambridge, MA: The MIT Press, 2017.

Wark, McKenzie. *A Hacker Manifesto*. Cambridge, MA: Harvard University Press, 2014.

Wark, McKenzie. *General Intellects: Twenty-One Thinkers for the Twenty-First Century.* London, UK: Verso Books, 2014.

Winkelman, Michael James, and Thomas B. Roberts. *Psychedelic Medicine: New Evidence for Hallucinogenic Substances as Treatment, Vol. 1*. Westport (Conn.): Greenwood, 2007.